THE HISTORY OF GENERATION

1290
.7735

Examining

The ſeveral Opinions of divers Authors, eſpecially that of Sir *Kenelm Digby*, in his Diſcourſe of BODIES.

With

A general Relation of the manner of Generation, as well in Plants as Animals: With ſome Figures delineating the firſt Originals of ſome Creatures, evidently demonſtrating the reſt.

To which is joyned a Diſcourſe of the CURE of WOUNDS by SYMPATHY, Or without any real applycation of Medicines to the part affected, but eſpecially by that Powder, known chiefly by the name of Sir *GILBERT TALBOT'S* Powder.

By NATH. HIGHMORE, lately of *Trinity Colledge* in *Oxford*, Doctor of Phyſick.

1872
LIBRARY OF CONGRESS
CITY OF WASHINGTON

LONDON,
Printed by *R. N.* for *John Martin*, and are to be ſold at the Bell in S. *Pauls* Church-yard.
1651.

C

QH471
.H6

To the Honourable, Mr. Robert Boyle, Son to the Right Honourable the late Earl of *CORK*, my much Honoured Friend.

Noble Sir,

WHere Virtue ſhall bee found in conjunction with Noblity in ſuch black, the laſt and worſt times, it no leſſe invites and amazes the eyes and hearts of be-

holders, then ſome new Star or blazing Comet: but with this difference; the one is cauſe of their fear, the other gives life to their hopes and joy. You have, *Sir*, ſo inricht your tender years with ſuch choice principles of the beſt ſorts, and even to admiration managed them to the greateſt advantage; that you ſtand both a pattern and wonder to our Nobility and Gentry: who in theſe paſt times many of them have ſo ſpent their precious Minutes, that they are ſcarce able to account for one, or ſpend an hour but in vice: that cannot brook Virtue, becauſe it is not born with them; that

hate

hate all things that muſt be obtained by induſtry. Who moſt degenerately intruſting their wits as well as fortunes with their inferiours, have made them Maſter of both; a ſad forerunner (I will not ſay Author) of theſe ſadder times.

But you have made a better and far nobler choice, you have not thought your blood and deſcent debaſed, becauſe married to the Arts. You ſtick not to trace Nature in her moſt intricate paths, to torture her to a confeſſion; though with your own ſweat and treaſure obtained. Being raviſht, Sir, with theſe conſiderations of your worth and candor, I

ſhall not fear to throw theſe Papers into the boſom of your protection; from whom as I cannot miſſe a judicious cenſure, ſo I ſhall hope for a candid reception. They are Diſcourſes which have buſied the Heads and Pens of many judicious and learned, amongſt whom our noble Author hath not deſerved the loweſt eſteem. I ſhall not preſume to theſe phanſies with their maturer births. Yet perhaps ſomething may here be found, that may encourage others to a farther ſearch. I ſhall not deſpair of your own, which may give a better account and a plenary ſatisfaction, if it may be,

in

in theſe ſo labyrinthean works of Nature, which is all I have laboured for, and ſhall ſtill be, (as likewiſe for the preſervation of your health) the prayer of

Sherborne,
May 15.
1651.

Your Honours moſt
humble Servant,

NATH. HIGHMORE.

An Explanation of the following Figures in both Tables.

THe firſt Figure, of the firſt Table, ſhews the Kidny Bean opened; in which is a little crooked leaf folded up, which being diſplayed, ſhews it ſelf, as in the ſecond; and when, being ſet, it ariſes above ground, it is ſuch a Plant as the third ſhews; with the very ſame leaves and no other.

The ſecond Figure ſhews a Colewort ſeed: the firſt ſhews both leaves, with the ſtalk folded up, as they lie in the husk of the ſeed: the ſecond ſhews it come up out of the ground.

The third Figure hath the ſmall germen of an Aſh; lying with his two leaves in the kernel of an Aſh, both in

in the husk incloſing them. The ſecond ſhews him ſprung up above the Earth, at his firſt coming abroad.

The fourth delineates the young germen of the Peaſe in the midſt of the grain, and its breaking forth.

The fifth ſhews the young Plant in the midſt of the Bean: with the manner of his putting forth, with the ſame leaves diſplayed in the third, which are wrapt up in the firſt and ſecond.

The ſixth Figure diſplayes the young Maple wrapt up in his husk; and how he lies, as in the firſt: The ſecond ſhews him a little unfolded, when it is taken out of the husk. The third ſhews him gotten from his ſhell, and the ſurface of the Earth.

The ſeventh Figure ſhews what progreſs the Chick hath made in his formation, in the third day after incubation.

The eighth ſhews the Chick perfectly formed in his ſhell not long before his excluſion; with the Yolk almoſt whole; deſcribing the manner of his lying in the ſhell. The

The ſecond Table ſhews the growth of the Chick in the firſt dayes Incubation.

THe firſt Figure demonſtrates the Eggs taken from their ſhels in a diſh, with the Chalazæ, and Cicatricula: which in *A* that was never ſat on, is but ſmall. In *B* that hath endured the heat of the Hen one whole day, ſomething dilated. In ſome new layed Eggs, I have ſeen it no more altered the third day.

The ſecond Figure delineates the ſecond dayes obſervations and change in the Egg; the large dilation of the Cicatricula, with all its Circles.

The third Figure ſhews the growth of the Chick, and alteration in the Egg, the fourth day.

The

The fourth and fifth Figures, ſhew the fifth dayes addition to the former growths.

The fifth ſhews him taken from the Yolk, and White, with a delineation of all his parts, as they appear lying round together in the Egg.

An

An INDEX of the Chapters contained in this History of Generation.

THE opinion of Philoſophers touching Generation, Chap. 1.

The Conceipt of Sir Kenelm Digby, touching the generation of Creatures, Chap. 2.

A ſhort cenſure of the former conceipt, Chap. 3.

The true way of Generation ſet down in general, with the examination of ſome repugning Arguments of ſeveral Authors, Chap. 4.

A more particular narration of the way of Generation, Chap. 5.

How Plants are generated, Chap. 6.

How Animals are generated, especially Insects, Chap. 7.

How those Creatures are generated that are bred from Eggs. Chap. 8.

The generation of Animals brought forth alive, Chap. 9.

How difference of Sexes and Similitude with the generators is caused, Chapter 10.

Several Arguments against this opinion proposed, and answered, Chap. 11.

THE

Fig: 1.a

Fig: 2.a

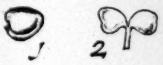


Fig: 3.a

Fig 4.ta

Fig: 5.ta

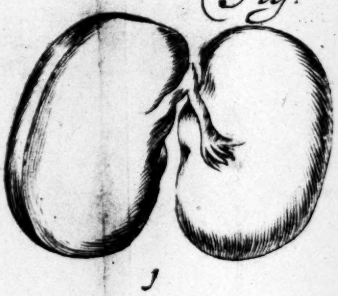


Fig: 5.ta.

Fig: 6.ta.

Fig: 6.ta

Tab: 1a.

Fig: 7.a

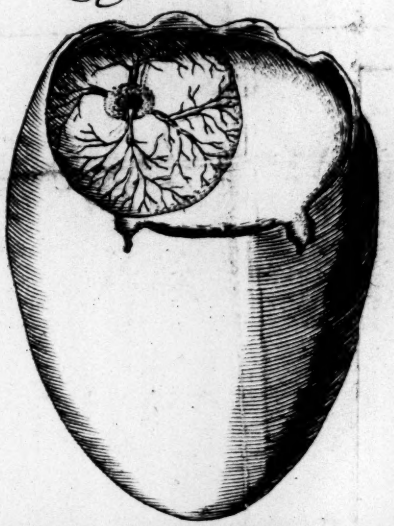


Fig: 8.th

Fig: 1a.

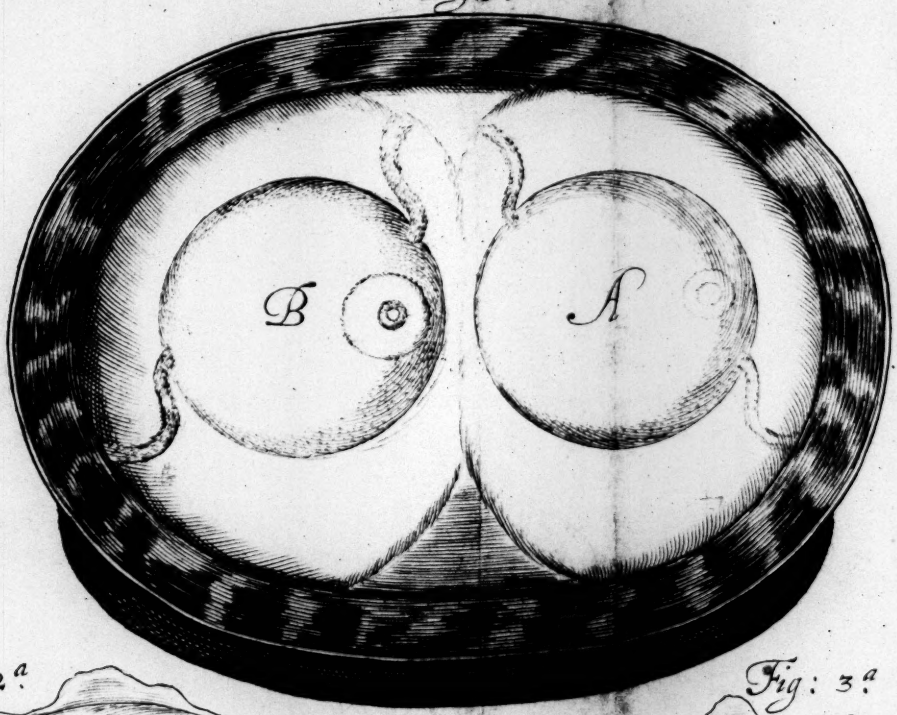


Fig: 2a.

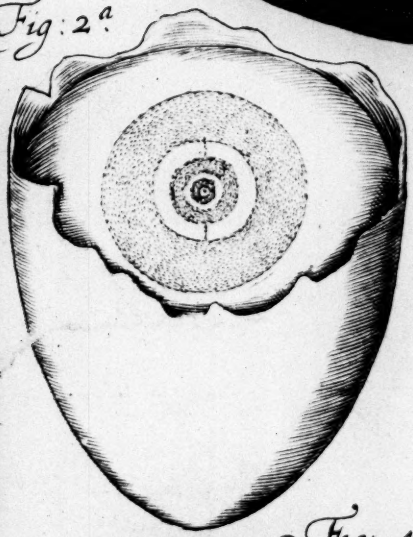
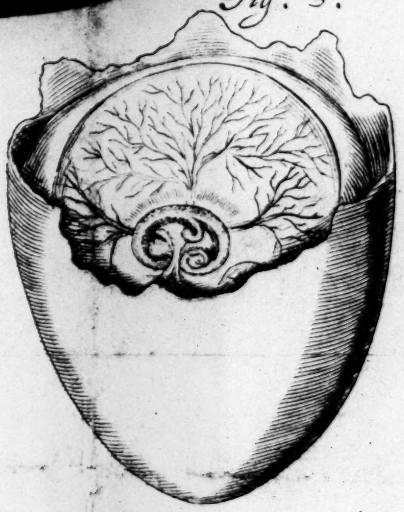


Fig: 3a.



Tab: 2.

Fig: 4ta

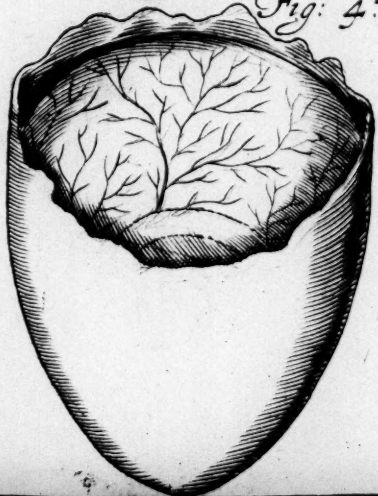


Fig: 5ta

THE HISTORIE OF GENERATION.

The Opinion of Philosophers concerning Generation.

Chapter the First.

THE ancient Philosophers have taught us that all subsisting Bodies consist of two parts, *Matter* and *Form*: the first they would have us believe to be compos'd of four jarring Bodies, which they call Elements, indued with as many proper qualities, which they called *Prime*: as if from the various mixture of these did arise all other qualities.

Some later Philoſophers, ſeeing themſelves begirt within ſo ſtraight and narrow bounds; and finding ſome effects much out-ſtripping the power of ſuch a ſlender mixture, have told us of occult Qualities; which ariſe from ſome other Bodies not yet known or diſcerned in the compoſure.

Our Chymiſts aſſure us for certain, that in the diſſolution of all mixt Bodies, they finde other Elements beſides thoſe four, we received from the Ancients. And perhaps could their ſeparations and putrefactions be as accurate to diſtinguiſh, as Nature is in the mixing, wee might finde many more, from whence theſe ſtrange effects in ſeveral Bodies ſhould ariſe. For indeed how can we imagine that the complicated and reiterated mixture of heat, & cold, moiſture and drought, ſhould ever produce thoſe ridling effects of Mercury, the Loadſtone, and many others. But this diſcourſe I ſhall leave to thoſe that have largely handled it.

The

The ſecond part which they call *Form*, *ab informando*, they ſcarce tell us whence it comes; onely magiſterially they teach us, (and we muſt believe them) that it ariſeth from the power of the matter.

But how this, if rightly conſidered, doth agree with their own principles, ſeems ſomewhat difficult to unriddle, *viz.* How a Subſtance (as they grant all Forms to be) can ſubſiſt in an accident, which hath no being of it ſelf, is no leſs a Riddle, then repugnant to their own grounds.

This ſome of our later Philoſophers have very well diſcovered; and ſhewed us, that thoſe Forms wch they thought and taught to bee but potentially in the matter, are there actually ſubſiſting; though till they have acquired fitting Organs, they manifeſt not themſelves. And that the effects which are done before their manifeſtation, (as the forming and faſhioning of the parts wherein they are to operate) can riſe from

nothing elſe but from the Soul it ſelf. This likewiſe I ſhall leave to the Readers enquiry, and ſhall follow that other way of introducing Forms, and Generation of Creatures, (as well Animals, as Vegetables,) which gives Fortune and Chance the preheminency in that work. A conceipt lately vented by the noble Author of the two Treatiſes, the one of Bodies, and the other of Mans Soul: Where he deſcribes the motions that are in Plants, (which are Nutrition and Generation;) to be, by one part tranſmitting unto the next to it, the juice which it received from that immediately before. So that there is one conſtant courſe from the root, (that ſucketh this juice from the Earth) unto the top of the higheſt ſprig. And the paſſage of this moiſture from one to another, is in a manner but like the riſing of Water in a Still: wch by heat is made to creep up by the ſides of the Glaſs, and ſo by the external cold is faſhioned into that Body which at laſt it is. Let us hear him deſcribing the manner of it himſelf.

The Conceipt of Sir Kenelm Digby *concerning the Generation of Creatures.*

Chapter the Second.

Chap. 23. *Sect.* 7. LEt us frame (ſaies he) a conception; that not far under the ſuperficies of the Earth, there were gathered together diverſe parts of little mixed Bodies; which in the whole ſum were yet but little; and that this little Maſs had ſome exceſs of fire in it, ſuch as we ſee in wet Hay, or in muſt of Wine, or in wort of Beer: And that withall the drought of it were in ſo high a degree as this heat ſhould finde no means, (being too much compreſſed) to play his game: and that, lying there in the boſome of the Earth, it ſhould after ſome little time, receive its expected and deſired drink, through the benevolence of the Heaven; by which it being moiſtned, and thereby

made more pliable, tender, and eaſie to be wrought upon, the little parts of fire ſhould break looſe; and they finding this moiſture a fit ſubject to work upon, ſhould drive it into all the parts of the little Maſs, and digeſting it there, ſhould make the Maſs ſwell.

This increaſe (ſaies he) of bulk, and ſwelling of the little Maſs, wil of its own nature be towards all ſides, by reaſon of the heat, whoſe motion is on every ſide, from the center to the circumference. But it will be moſt efficacious upwards towards the Air; becauſe the reſiſtance is leaſt that way, both by reaſon of the little thickneſs of earth over it, as alſo by reaſon that the upper part of the earth lieth very looſe, and is exceeding porous, through the continual operation of the Sun, and falling of rain upon it. It cannot chooſe therefore but mount to the Air, and the ſame cauſe that maketh it do ſo, preſſeth at the ſame time the lower parts of the Maſs downwards. But what aſcendeth to the

Air

Air muſt be of the hotter, and more moiſt parts of the fermenting Maſs, and what goeth downwards, muſt be of his harder and drier parts; proportionate to the contrary motions of Fire and of Earth, which predominate in theſe two kindes of parts. Now this that is puſhed upwards, coming above ground, being expos'd to Sun and wind, contracteth thereby a hard and tough skin on its outſide, but within is more tender. In this ſort it defendeth it ſelf from outward injuries of weather, whiles it mounteth; and by thruſting other parts down into the Earth, it holdeth it ſelf ſtedfaſt, that although the winde may ſhake it, yet it cannot overthrow it. The greater this Plant groweth, the more juice is daily accrewed unto it, and the heat is encreaſed, and conſequently, the greater abundance of humors is continually ſent up; which when it beginneth to clog at the top, new humor preſſing upwards, forceth a breach in the skin, and ſo a new piece like the

main ſtem, is thruſt out and beginneth on the ſides, which we call a branch. Thus is our Plant amplified, till Nature not being able ſtill to breed ſuch ſtrong iſſues, falleth to works of leſſe labour, and puſheth forth the moſt elaborate part of the Plants juice, into more tender ſubſtances: but eſpecially at the ends of the branches; where abundant humor, but at the firſt not well concocted, groweth into the ſhape of a Button; and more and better concocted humor ſucceeding, it groweth ſofter and ſofter, (the Sun drawing the ſubtileſt parts outwards) excepting what the coldneſs of the Air, and the roughneſs of the Winde, do harden into an outward skin. So then the next parts to the skin are tender; but the very middle of this Button muſt be hard and dry, by reaſon that the Sun from without, and the natural heat within, drawing and driving out the moiſture, and extending it from the Center, muſt needs leave the more earthy parts much

ſhrunk

ſhrunk up, and hardned by their evaporating out from them. This Button thus dilated and brought to this paſſe, we call the fruit of the Plant; whoſe harder part encloſeth oftentimes another, not ſo hard as dry. This drought maketh theſe inner parts, to be like a kinde of duſt, or at leaſt ſuch as may eaſily be dried into duſt, when they are bruiſed out of the husk that encloſeth them. And in every parcell of this duſt, the nature of the whole reſideth, as it were contracted into a ſmall quantity: for the juice which was firſt in the Button, and had paſſed from the root through the manifold varieties of the diverſe parts of the Plant, and had ſuffered much concoction, partly from the Sun, and partly from the inward heat, impriſoned in that harder part of the fruit, is by theſe paſſages, ſtrainings, and concoctions, become at length to be like a tincture extracted out of the whole Plant, and is at laſt dried up into a kinde of magiſtery. This

we

we call the Seed, which is of a fit nature, by being buried in the Earth, and diſſolved with humor, to renew and reciprocate the operation deſcribed.

But a ſenſitive Creature (ſaith he) being compared to a Plant, as a Plant is to a mixed Body; you cannot but conceive, that he muſt be compounded, as it were of many Plants, in like ſort as a Plant is of many mixed Bodies: But ſo, that all the Plants, which concur to make one Animal, are of one kinde of nature, and cognation. And beſides, the matter, of which ſuch diverſity is to be made, muſt of neceſſity be more humid, and figurable, then that of an ordinary Plant: and the Artificer, which worketh & mouldeth it, muſt be more active. Wherefore we muſt ſuppoſe, that the Maſs, of which an Animal is to be made, muſt be actually liquid; and the Fire that worketh upon it, muſt be ſo powerful, that of its own nature, it may

be

be able to convert this liquid matter, into ſuch breaths and ſteams, as we ſee do ariſe from Water, when the Sun or Fire worketh upon it. But leſt this moiſture being wrought on by ſuch an active heat, ſhould vaniſh quite away; we muſt ſuppoſe it to have ſuch unctuous parts, that may hold them together; ſo that the heat impriſoned in this viſcous liquid matter, riſeth in bubbles: and by reaſon of its ſolid unctuouſneſs cannot break forth, but ſtretch themſelves longer and longer; and every one would be as it were a little Brook, whereof the chanel would be the encloſing viſcous ſubſtance, and the inward ſmoak that extendeth it, might be compared to the Water of it.

This liquid ſmoak-like ſubſtance, the Fire works on in theſe Chanels, he makes to be three-fold; Firſt, Watry ſtreams, which firſt flie out, ſettle in the remoteſt parts, and is fitteſt for figuration. Secondly Oily, which give to the other continuance, and ſolidity.

Thirdly,

Thirdly Fiery, which is made of the groſſer, more fixt parts incorporated with Fire, having ſufficient moiſture to keep it flowing, and is like a Cauldron of fire; and theſe laſt vapours are for the continuance of heat. Theſe three Brooks in a ſenſitive Creature, ariſe from three Sources or Fountains, the Heart, the Brain, and the Liver, and are conveighed in three ſeverall Chanels; the Arteries, Nerves, and Veins, and give unto the Animal, heat, ſenſe, and nouriſhment.

A Short Cenſure of the former Conceipt.

Chapter the Third.

HOw much this Conceipt ſubverts the antique principles of Philoſophy, I ſhall not here undertake to demonſtrate: How far it ſhoulders out Truth it ſelf, and ſo blots out thoſe indeleble Characters, fixt by the finger of

of the Creator on every ſpecies; thoſe inſcriptions on all his works, the diſtinct conſtitutions, parts, operations, and figures (which are as ſo many Buſhes, or Signes hung out, to diſcover what are the inhabitants within) will eaſily ſhew us. For if heat rarifying a ſubſtance, making it thruſt it ſelf into a larger ſpace were the ſole author of all generation; and were the cauſe why Plants grow up in ſtalk and leaves, and downwards in root: we muſt either admit thoſe differing Characters to be vain accidental chances, or elſe look out ſome other agent, from whoſe fruitful womb, this variety might ſpring forth. If we but muſter over the numerous Regiments or ſeveral ſpecies of Plants, and conſider how this grows up with a ſquare ſtalk, that with a round; ſome ſtart up hexangular, others triangular; ſome bear a fruit of one form, ſome of another: and in them faſhion ſeeds, of as differing figures as themſelves. How the leaves

leaves alſo and flowers ſhew as much of variety, as skill in the Workman; every Plant being by them as ſoon diſcern'd, as ſeen. Let us call over likewiſe the differing numbers of Animals, Inſects, and others; and examine all the ſtarting holes, that Fire can breathe forth a ſtream by; all the caſual compreſſures of cold, or external accidents; and compare them together, we ſhall ſee whether ſuch a fruitful ſtock of variety in colours, ſhape form, vertue, and many other differing ſignatures, can be the iſſue of ſuch accidental, and equivocal parents.

If this formation of Creatures ariſe from heat extending, and enlarging a ſmall moiſtned lump; without any other conſideration, why are not theſe Atomes extended circularly; and ſo all Bodies ſhould be caſt into the ſame Mould with the Heavens; and ſhould, as they ſeem to us, be all ſphericall. But he tells us of ſome light parts, that, beſides the power of the Fire enforcing, naturally

naturally climb upwards: and of others, which by their natural weight, are perſwaded to ſink into the Earth, to hold the mounting parts ſtedfaſt, that they may not be overthrown by Windes. But were there nothing elſe to give a figure to Plants, but aſcending and deſcending, of light and heavy parts; whence ſhould that variety ariſe in the faſhion of thoſe aſcending and deſcending parts: the weight of the parts ſhould carry them directly downwards, as the lightneſs doth upwards; and ſo all roots ſhould deſcend in one continued round, but long, lump: what then makes ſome ſpherical, others ſtretching out infinite numbers of hairy threds; ſome directly downwards, others parallel to the ſuperficies. The Author tells us the figures of them, as of the aſcending parts, are cauſed by ſome external accidents: As when the more hot and moiſt parts are aſcended, and broken from the priſon of the Earth, the cold air compreſſeth and hardneth

the

the external parts, and ſo enricheth this ſprouting upſtart, with a hard tough skin; both armour and clothes to protect the interior ſofter parts. The hardneſs of the Earth, likewiſe compreſſeth the deſcending parts, into ſuch forms as we finde them of. But may not the truth of this be vehemently ſuſpected; when, if we examine the coat, we ſhall finde it more penetrable then the Body: and more ſubject to external injuries, then that incloſed? as in all Trees and Plants, the Bark and Rinde is of a more flexible, tender, and ſoft compoſure then the inveſted Trunk: and the hard ſolid ſhell of Walnuts, Almonds, ſtones of Plumbs, &c. are invironed with a very tender ſubſtance. Beſides this, there is yet a greater doubt, how this external cold air ſhould in the ſame place, at the ſame inſtant of time, faſhion theſe mounting Atoms into a round ſtem, with a long, ſharp leaf: and cloſe by that, compreſs others into a ſquare, hexangular, or triangular

lar ſhape; with leaves round, jagged, indented, ſcollopt, or the like? as may be ſeen in ſeveral Plants, inhabitants of the ſame piece of ground, under the ſame Heavens, inviron'd with the ſame Air, and heavenly influences. Theſe diſtinct figures cannot ſpring from the cold circumſtant Air; for this applying it ſelf alike to all, and every ſide of theſe aſcending parts, ſhould equally compreſſe every part; and ſo all Plants ſhould ſprout up cylindrical, as the Trunks of Trees do.

The Fruit alſo and Seed, which he calls a Button, or greater quantity of thoſe hot and moiſt parts collected, and duſt or parts dried into the form of duſt, by the external heat of the Sun, and innate heat of the Plant; are in a more orderly method framed and repos'd. For not onely in qualities, but in figure, they much vary one from another. One producing a ſeed inclos'd onely in a husk; another a ſeed of differing figure inclos'd in a fruit, and hard

ſhell. Is cold Air the fruitful Mothe
of this variety too? Nay, if we bu
more ſeriouſly examine this duſt, w
ſhall finde it orderly ſet, with nave
ſtrings, affixt to ſome part of their in
cloſing Matrix; by which nouriſhmen
is conveighed for their growth, an
ſubſiſtance. And if we ſhall further a
natomize theſe duſts, we ſhall find
laid up in them Plants; the very ſam
Identical Plants, which firſt grow up
after the ſeeds are committed to th
ground. In which indeed reſides th
nature of the whole. And this youn
ſeminal Plant, we may truly call th
extracted tincture, or Magiſtery of th
whole Plant; as ſhall more largely ap
pear hereafter.

Neither doth his 25 Chapter (where he endeavours to ſhew how this wonderful effect, as he calls it, is performed: how a Plant or Animal comes by that figure it hath) afford us any greater ſatisfaction. For if we examine his firſt principle, *viz.* That the ſeveral figures

of

of Bodies, proceed from a defect in one of the three dimenſions; cauſed by the concurrence of accidental cauſes; we ſhall finde it extreamly ſtraightning the moſt delightful variety of the Creation, and the infinite power of the Creator. For upon theſe grounds it muſt be ſuppoſed, that the moſt perfect figure is to be cubical, and all Bodies ſhould have been caſt into that mould, but that ſome external cauſes ſtepping in, hinder almoſt all from obtaining that perfection: the Creator not being able to withſtand their prevalency; or by patching up that defect, could not give perfection to all that, which his own mouth aſſures us was good. The examples alſo which he produceth, teach us there is but little truth in this poſition; for how can we conceive the watry drops of rain falling, ſhould ſuffer violence (as to be pared round) by the ſofter Air, which is not able ſo much as to hinder it from falling? The faſhioning of Salts

(as he relates) doth as little ſatisfie. As for Alume, it is not of ſuch unctuous parts as he reports; for how then could it ſo indiſcernably be diſſolved in Water, and ſo much reſiſt Fire, which is not proper to unctuous Bodies? Beſides, being diſſolved and falling again, what ſhould hinder the parts from meeting all in a lump, and conforming themſelves to the faſhion of the bottom of the Veſſel, in which they are contained; as we ſee all unctuous Bodies do? As for Salt, if that ſhould acquire his figure on the ſuperficies of the Water as he informes us, it ſhould be only long and broad, without thickneſſe: whence then come thoſe exact cubical forms in Salts, which are ſuffered to coagulate of themſelvs. Where you ſhall finde the moſt exact Mathematician out-gone by this natural Art. Neither is this cauſed by the falling of parts one upon another, (as hee ſpeaks before of Alume) ere the former are throughly hardned: for then why

why ſhould it not ariſe ſtill in height, by the continual addition of deſcending parts, as long as there are any Attoms to fall, by which meanes it ſhould not become cubical, but a long ſquare. But we finde the contrary, while it moſt exactly caſts it ſelf into cubes; the angles ſometimes looking upwards, ſometimes tranſverſly; which were impoſſible, if thoſe ſquares were made, by long and broad Bodies falling one upon another. And vitriol, though calcined to perfect redneſs, if diſſolv'd and fixt again, not onely recovers his bright ſhining greenneſs, but is ſquared out into various angles, looking every way, as if it had been faſhioned by the hand of the Artificer.

The figure of Saltpeeter is almoſt neglected by him; onely he tels us, that by reaſon of its drineſſe, it is more difficultly figured, and therefore is not equally increaſed. But if we examine it well, we ſhall finde it more unctuous, then the other two, and is more readily

readily caſt into that figure, then the other. For it doth not onely ſhoot forth preſently almoſt in water, after it is removed from the heat; but we ſhall finde it oftentimes upon new Wals ſhot forth to a great length, without the help of Water to faſhion it in. So that there ſeems to be ſome more particular agent to be found out, that immediately imprinteth theſe determinable figures; which ſhould rather work by a conceived deſigne of producing ſuch a figure, in ſuch a Body. How elſe could ſuch effects continually be wrought, (accidental cauſes working not ſtill alike) and therefore it were impoſſible to expect ſcarce a ſimilitude in the works.

The formation of Animals affords us little leſſe perplexity. How heat ſending forth, or how thoſe vapours emitted ſhould ſettle themſelves in ſuch and ſuch method. and form; ſuch variety of parts without ſome other director cannot appear. That there are in

in all Animals three ſorts of chanels, is an unqueſtionable truth; but that there are diſtinct Bodies conveighed by them, though taught us by our Maſters, is not granted, nor by him received for a truth. For in the next Chapter we ſhall finde him applauding the circulation of the blood; and deſcribing its motion through, and from the Arteries to the Veins, and from them to the Arteries again. Both of theſe chanels then muſt be filled with the ſame liquor; onely perhaps in the Veins it may be ſomething cooler, and thicker; as our Bath waters are leſſe hot in the gutters, then in the ſpring. That which is conveighed in the other chanel, the Nerves, we can ſcarce afford it the diſtinction of another Body; it being only the pure, and moſt ſubtile ſelected parts of the blood, which was conveighed in the other two chanels. Neither, if it were granted that three diſtinct Bodies, were continually traverſing thoſe three ſe-

veral chanels into the Bodies of all Animals; doth he ſhew us, how they put themſelves into ſuch various ſhapes and figures, (when they have eſcaped this conquering expelling heat) as we finde them wonderfully expreſt in every creature.

All things ariſing in fumes & ſteams, as moiſt Bodies wrought on by heat will do, when they are freed from that which rarified them, return to their own nature and forms again. As Water rarified, (when thoſe minute particles of heat that divides it into ſuch ſmall Atomes, and mixed themſelves with it, are either loſt or overcome by the watery Atomes,) returns again to water. Or if thoſe particles remain ſtill active, they do but further divide it; and ſo it becomes more like Fire, by having a greater number of fiery Atomes mixed with it, yet is not made another thing, either in ſubſtance or figure. But in the generation of Creatures, it is far otherwiſe; where the

preduct

product or effect is much differing from what the matter or the agent were. Now how this difference doth arise, and how this change is wrought, we must enquire a little further, then what heat and moisture will lead us unto.

The true way of Generation set down in general, with the examination of some repugning Arguments, of several Authors.

Chapter the Fourth.

HAving thus far wandered in the search of a truth, examining those opinions which have endeavoured its discovery; and finding them much failing in their labours: I shall the more boldly attempt the same enterprize: hoping if I fail in so great a businesse, to passe along in the crowd, though not undiscern'd, yet favourably censured.

The

The production of all Creatures, after the first Omnipotent *Fiat* was executed; is by Philosophers called *Generation*. Which is performed by parts selected from the generators, retaining in them the substance, forms, properties, and operations of the parts of the generators, from whence they were extracted: and this *Quintessence or Magistery* is called the *seed*. By which the Individuals of every Species are multiplied; and that which the Almighty for its transgression, made to have an end; by the fertility of this Sperm, is continued to immortality.

From this all Creatures take their beginning; some laying up the like matter, for further procreation of the same Species.

In others, some diffus'd Atomes of this extract, shrinking themselves into some retired parts of the Matter; become as it were lost, in a wilderness of other confused seeds; and there sleep, till by a discerning corruption they

they are ſet at liberty, to execute their own functions. Hence it is, that ſo many ſwarms of living Creatures are from the corruption of others brought forth: From our own fleſh, from other Animals, from Wood, nay, from every thing putrified, theſe impriſoned, ſeminal principles are muſter'd forth, and oftentimes having obtained their freedom, by a kinde of revenge feed on their priſon; and devour that which preſerv'd them from being ſcatter'd.

Neither are theſe without their ſubordinate forms; for from the walls of their bodies frequently, broken by corruption, iſſue forth other Creatures, differing in *ſpecie* from themſelves; as whoſoever will but examine the production of *Inſects*, ſhall eaſily finde.

This ſeed conſiſts of two parts, *Material Atomes*, animated and directed by a ſpiritual form, proper to that ſpecies whoſe the ſeed is; and given to ſuch matter at the creation, to diſtinguiſh it from other matters, and to make

make it ſuch a Creature as it is. Both which are ſeparated, the Material Atomes from the body; the form, from the form of the generator. Which in Vegetables, and ſenſitive Creatures, where the forms are compoſed of material ſubſtances, our Philoſophers are eaſily perſwaded to believe. But how the immortal ſoul of man, ſhould be communicated to theſe corruptible material Atomes of the ſeed of Man, without prejudice to its moſt pure nature, ſeems a Riddle to our Philoſophers, and impiety to our Divines. I ſhall not undertake thoſe large diſputes *pro* and *con* about this argument, but do believe the Soul of Man may be traduced, though not generated; may ſpread and multiply it ſelf into many, without fear of corruption. It being a ſubſtance incorruptible, immortal, like the Creator, the breath of his own mouth, which ſtill retains ſo much of that nature, from whence it was breathed; that without the leaſt diminution, it

is

is able to communicate, and dilate it ſelf into many Millions, and yet ſtill remain the ſame entire ſubſtance that at firſt it was.

For the material part of this ſeed, there is a large diſpute, whether it be *à toto vel à parte deciſum.* I ſhall not ſtand to tell you the names of thoſe that are Patrons of the one, and of the other: nor rehearſe their Arguments. If you examine them, you ſhall finde theirs moſt rational, that affirm the deciſion from the whole body; what we finde more particularly diſcours't of by our forementioned Author, in his 24 Chapter, we ſhall take up and a little review. Where he hath truly and fully evicted the wandring phancies of ſome, that would have this compound of ſeverall parts, to be collected from every particle, ſo as paſſing by, or through every little Atome of the Parents body, in its paſſage; ſhould be impregnated, and imbued with the nature of it, and ſo retire to the reſerve where

where it is kept for generation. And afterwards theſe particles being fermented by convenient heat, do take their poſture and ſcituation; according to the poſture and diſpoſitions of thoſe Atomes they viſited in their paſſage, and from whom they received thoſe imbibed natures. But this circulating our Author tells us, is impoſſible. I will not wrong him ſo much as to rank his more ſolid reaſons with mine own. Could we finde theſe chanels and conveighances in the Body, by which this matter ſhould paſſe; yet I might doubt of the unqueſtionable verity of this doctrine. For what ſhould hinder this matter circulating about the Body, from receiving qualities, and ſo likewiſe the nature of every part it paſſeth by; and ſo every particle of this matter, ſhould be impregnated with the natures of the whole; and every ſmall Atome ſhould become a living Creature, or elſe the Subſequent ſhould blot out the Antecedent Character,

Character, and the impreſſion ſhould be onely from the laſt part. We may likewiſe as truly, as ſafely conclude with our Author, that it is impoſſible for every little part to remit ſome parts impregnated with the nature of that whole part from whence it fell. This by ſome is thought to be done by that *Quaſi epilepſia in coitu*, that kinde of convulſion or concuſſion of the parts, by which is ſhook off from them ſomewhat retaining the nature, and property of every part, and theſe being joyned, make up the Seed. This ſeems to be very much befriended by our Authors relation of the Cats kitned without tails: and the Womans daughters with ſix fingers upon a hand. My ſelf alſo have ſeen a kinde of Poultry without rumps: which breeding with their own kinde, ſtill brought forth Chicken wanting that part: If with others, ſometimes they had rumps, ſometimes but part of a rump. And not long ſince I ſaw a Mungril Bitch, that had her tail

tail cut cloſe to her body almoſt, whoſe Whelps were half without tails, and half with tails: the next year following, ſhe brought them forth all with long tails, as ſhe had before the cutting off. Which though it ſeems to favour (as I ſaid) this opinion, it doth no way confirm it; as may appear by the more frequent perfect generations of mutilated creatures; which beget children or iſſue with two legs or arms, though they had but one; Spaigniels, whoſe tails are always cut, bring forth Whelps whoſe tails need as much cutting, as their Dams or Sires did. Wee muſt therefore look out ſome other way, how this may be done, without the parts themſelves.

Some others have ſuppoſed this deciſion to be made from the blood, when it is *tantum non aſſimilatus*; after it hath undergone all its concoctions, and received all its names chriſtned by the *Arabians*, of *Humoris innominati, Roris, Glutinis, & Cambii*: and is faſtned to

to the part, but not perfectly aſſimilated; and this being ſelected, and repoſited in convenient veſſels, receiving ſome kinde of impreſſion from the part from whence it was divided; it retains ſtill an imperfect ſignature, and delineation of them; and makes up that which we call the *ſperm*. But I ſhall here want Anatomie to inſtruct me, how this Cambium, this thinner, or not yet confirmed, or hardned ſubſtance of every part, ſhould deſert its hold; and being ſhaken off, ſhould be conveighed into the ſeminal Veſſels. All which, returns to the firſt opinion confuted by our Author. Who hath likewiſe fairly cleer'd the other part of the doubt, whether this matter be divided, or taken only from ſimilar parts alone, and ſo the matter of bone, ſhould accordingly to the conveniency of place and uſe, become round, blady, circular, or long, and the fleſh likewiſe, only by the help of fermenting heat.

After our noble Author hath ſo ſtre-

nuouſly confuted theſe phanſies, we ſhall finde him laying down his own opinion, and ſeeking ſome other means and courſe of Generation: He tels us, that the ſuperfluous part of the nouriſhment, when it is drained from the reſt, and reſerv'd in a convenient place, by little and little through digeſtion gaineth vigour, and ſpirits, and becomes a homogeneal body, like to other ſimple compounds; which by other degrees of heat and moiſture, is changed into another ſubſtance, and that again by other temperaments into another. And thus by the courſe of nature, and by paſſing ſucceſſively many degrees of temper, and by receiving a totall change in every one of them; at length an Animal is made of ſuch juice as afterwards ſerves to nouriſh him.

But if we more ſeriouſly examine this aſſertion, we ſhall finde it to leave the truth very much behinde it. For firſt, if we but look on the Body to be nouriſhed; we ſhall finde it to be compos'd

poſ'd of many ſeveral parts, of differing natures, which would ſufficiently inſtruct us in the diſagreeing and heterogeneal particles of that which nouriſheth this heterogeneal Body. But if we more curiouſly anatomize this juice or blood, it will abundantly ſhew us, it is no homogeneal Body; neither therefore can that ſuperfluous part ſelected and drained from it, claim that priviledge.

Should we grant this, it cannot appear how heat working upon this homogeneal body, ſhould make in it a total change in the nature of it; or create it an other ſubſtance quite different from the firſt, making it leſſe homogeneal. And in every digeſtion or operation of heat upon it, it ſhould become ſtill leſſe homogeneal, until that ſubſtance be produced which wee ſee compos'd of ſo many heterogeneall parts. If we examine the workes of heat, we ſhall finde it penetrating, dividing, and mixing of ſmall particles of

it ſelf, with the Atomes of the bodies it works upon; and in progreſs of time, divides the body into ſuch ſmall indiviſible parts, that it becomes like it ſelf, in reſpect of rarity. As Fire working on, and mixing it ſelf with Water, divides it into ſmall indiſcernable Atomes, which now attains unto the ſame rarity, and lightneſſe with the Fire; and being accompanied and intermixt with thoſe fiery Atomes, flies aloft, till at laſt diſliking one anothers ſociety, being far removed from the Agent rarifying them, they part companies. And then thoſe unſeen Atomes of Water, collect themſelves again to their former temper, and bulk, no whit changed or altered either in qualities or ſubſtance, which were impoſſible, were this change total, or could this action of heat create heterogeneall parts, in this homogeneal ſubſtance. If we further conſider the power of heat, (or any other qualities) wee ſhall ſurely finde, that in no action there can any

ſubſtantial

ſubſtantial thing be given, which is not originally in the agent, or giver. Fire could not give heat, nor Water, moiſture, unleſſe it were inherent in thoſe Bodies. Neither can heat or Fire working on an homogeneal body, give it any other heterogeneal parts then fiery ones; nor moiſture, any other, then moiſt ones, which indeed accidentally may give hardneſſe to bones, and ſoftneſſe to fleſh; but how comes this bony ſubſtance in this place blady, in that round, in another long? this Muſcle round, that triangular? this Plant of one form and nature, that of another? We muſt ſeek out ſome other agent to faſhion theſe parts, and to compoſe this difficulty; and confidently conclude, this way to be lame, and imperfect; of which our Author ſeems to be conſcious, and that makes him ſo ſtaggering, and at laſt falling upon an opinion, which he before in part rejected, *viz.* That the blood in its circulation viſiting every part, is impreg-

nated with the nature of them, and the pureſt part of this blood being extracted like a quinteſſence out of the whole Maſs, is reſerved in convenient receptacles till there be uſe of it; which is the ſeed, of which a new Animal is to be made. This imbuition of ſpecifique qualities from every part, will appear as impoſſible as the former. For firſt, there are many parts from which the blood doth not again return, as from all thoſe parts, which have attracted their ſpecifick nouriſhment from out of the veſſels; from them there is no return made. Beſides, the blood, in its circulation, is carried in veſſels of the ſame nature, from the one end of the body to the other; and out of thoſe veſſels there is not the leaſt motion in the blood. How theſe qualities ſhould be communicated from every particle, through the thick skins of the veſſels, ſeems ſomewhat ſtrange. Beſides all this, ſhould we grant this circulation through every particle, how comes

comes it to paſſe that receiving ſo many differing qualities, the one doth not confound the other, and that which is laſt impreſt doth not blot out all the reſt? Theſe or the like difficulties being kenn'd by our Author, makes him flye to another refuge; and to tell us, that the heart of every perfect Animal, containeth in it, the ſpecifick vertues of all the ſeveral parts of its own body; by reaſon of the bloods continual reſorting to it, in a circle from all parts of its body, and its being nouriſhed by that juice; ſo that the Heart is the abridgement of the whole, and imbueth the blood with thoſe ſpecifick qualities, from whence is extracted the ſeed. But neither can this cleer all the former difficulties. For how ſhall we ſuppoſe, ſo many diſtinct qualities to be impreſt in ſo narrow a compaſſe, as in the heart, without confuſion; or how ſo ſhort a ſtay in the heart, could implant ſuch a numerous Regiment of qualities in the blood; or why not dif-

fering faculties in the ſame particle of blood; all ſliding (without diſtinction) through the ventricles of the heart? we ſhall be forc'd therefore to ſeek out ſome other way, which indeed our Author hath chalkt out unto us, though himſelf hath not trod in it.

A more particular Narration of the way of Generation.

Chapter the Fifth.

OUr noble Author hath laid this ground for us, which I hope will eaſily lead us to the truth, *viz.* That it is neceſſary the parts ſhould be made in generation, of a matter like to that which maketh them in nutrition. Now what that is from whence every part receiveth his nouriſhment, wee muſt ſearch for in the blood: Which is a tincture extracted from thoſe things we eat, concocted and ſeparated in the Stomack,

Stomack, Liver, and Heart; and afterwards by its circulating in the Arteries and Veins, is pellicanized (as the Chymiſts term it) and becomes moſt pure, and defæcated from all its excrements, and is made a fit nouriſhment for every part. The things we eat are not ſimple, but compounded of as great a variety as the parts to be nouriſhed can expreſſe. What variety of Plants goes to the making up of one piece of fleſh we eat? What multitudes of differing Atomes are conjoyned in one piece of bread, or draught of drink, or Wine? The extract then ſure muſt be furniſht with as great a ſwarm of differing parts; onely here they are more refin'd, more ſubtiliz'd, and ſeparated one from another. But how doth this variety of parts in the blood, make it the fitter for nouriſhment? by comprehending in it ſmall indiviſible particles, cognate or ſimilar Atomes, which are of the ſame ſubſtance, eſſence, and nature with the parts, to which

which they are to be adjoyned, and aſſimilated: and want nothing but ſeparation, and afterwards union and conjunction with, to be part of thoſe particles, for whoſe nutriment they were provided; which operation is called aſſimilation. For then theſe ſimilar, or cognate parts, are become like to thoſe, to which they are joyned. And this is the matter and manner of our nutrition, wch if ſlightly conſidered, may perhaps go amongſt the number of falſities. But if we examine from the Creation, the product of Creatures from the confuſed firſt created Chaos; or ſince that time, the continual hourly decay, or expiration of every part of us, (in ſo much that Phyſitians allow us clearly a new Body every ſeven years,) we ſhall ſoon diſcover the truth of this poſition. How the great Architect fetcht from the bowels of this Lump, precreated particles, to ſupply him with fit matter for ſuch bodies; and appropriated

How nutrition is made.

priated forms for ſuch matter, will inſtruct us that there are ſuch particles, which being brought together conſtitute ſuch bodies. The continual expiration of particles from all bodies, will more cleerly illuſtrate it. The hourly decay is by expiration of material, the laſt diſſolution is both of material and formal Atomes. Now as all agree that material parts throughout multitudes of (nay all) mutations, remain incorrupted; ſo alſo according to, not onely the judgement, but ſeveral experiments of knowing men, diligent inquirers into the various works of Nature, and mutations of natural compounds; natural forms themſelves alſo do not periſh at their parting from their matters; but onely are diſſolved and diſſipated, lying after that in their ſcatter'd Atomes, confuſed and mixt with ſome others; conſtituting perhaps a quite differing body; ſo that the entity of the form, continues after corruption; though not in the formality of ſuch

ſuch a form. If it be ſo then that the matter of every particle in every body, and the Atomes of their forms likewiſe, ſtill remain, though ſcatter'd into millions of ſeveral bodies; what ſhould hinder, (when theſe Atomes are again rallied,) an eaſie union with particles of the ſame condition, and nature? and why ſhould not then the blood, which is made up of many and diſtinct bodies, be furniſht with the ſeveral Atomes comprehended in thoſe bodies: and thoſe Atomes being agreeable to our parts, be as eaſily united to them?

The way of nutrition being cleared; let us ſee now, how from the ſame matter generation is performed. This blood, that all parts might be irrigated with its benigne moiſture, is forc'd by ſeveral chanels, to run through every region and part of the body; by which means every part out of that ſtream, ſelects thoſe Atomes which they finde to be cognate to themſelves. Amongſt which

which the Teſticles (deſtined to that office from their firſt creation, as the Stomack and Liver were to digeſt) abſtract ſome ſpiritual Atomes belonging to every part; which had they not here been anticipated, ſhould have been attracted to thoſe parts, to which properly they did belong for nouriſhment. As the parts belonging to every particle of the Eye, the Ear, the Heart, the Liver, Stomack, Guts, the Hand, every particular bone, and muſcle, &c. which ſhould in nutrition, have been added (to repair the continual deperdition) to every one of theſe parts, are compendiouſly, and exactly extracted from the blood, paſſing through the body of the Teſticles; and being in this Athanor cohobated and repoſited in a tenacious matter (leſt being ſpiritual, and very fine, they ſhould loſe their vigor) at laſt, paſſe from the body of the Teſticles, by certain veſſels, in which through infinite Meanders, it undergoes another digeſtion and pelli-

canizing,

canizing, (as in another place I have ſhown.) And from thence, being now delivered from all its excrements, and furniſht with Atomes, fit for the making of every part and particle of an other Individuall; is treaſured up in certain Granaries, till the ſeed time comes. And this is the nature, ſubſtance, and manner of collecting the Seed. This ſhall be further illuſtrated by the ſeveral wayes of Generation in ſeverall Creatures, and firſt in Plants.

How Plants are generated.
Chapter the Sixth.

THeſe ſeminal Atomes are in the ſame manner ſeparated by all Vegetables, wch are watered in every Region by a certain juice, or blood which they attract & ſuck from their Mother Earth: which is nothing elſe but a confus'd Maſs of multitudes of forms, and ſubſtances, fit

What the Earth is.

fit for the nouriſhment and reparation of all things In which a Plant being fixt, preſently ſends forth his Purveighers on every ſide, his roots, wch ſupply the want of hands and mouth, to bring in its proviſion; who are finely palated too, & able to make choice of that tincture, which moſt delights their palats, beſt fits their own diet, and is moſt proper to repair their decaying ſelves in every part. This juice or blood they concoct,& ſtrain through their finer parts; and ſeparate them from other earthly excrementitious particles, (or ſuch as belong to another ſpecies) till it becomes fit only for the repairing of that Plant, for, and by which they were ſelected, and ſuckt out of the Earth. From this quinteſcence, this juice, are ſelected parts of the ſame ſubſtance, nature, qualities, and form with the Plant, and agreeing with every particle of it, whoſe blood it is, and from it, is the ſpecies propagated. But not after the ſame method, in all, for

in

in ſome, propagation is made by this juice reſiding in part of the Plant, pulled from the Trunk, and fixt in the ground: In others, by part of the root transfer'd: In others, by ſeed.

How a Sprig put into the ground grows.

The firſt is done by that juice which is retained in the part taken from the Plant, which reſerving parts fit for the nouriſhment of every particle in the Plant, from whence it was taken, hath now ſome parts which are veſſels, for that Sprig which is to be propagated. For thoſe Atomes which in the juice were to augment and repair the root of the Tree, being rapt from the Tree, are of no uſe, not having a root to adjoyn themſelves unto. Being therefore not attracted by any part of the Sprig, as not cognate and fit nouriſhment for them, by often circulation about this beginning Plant, are at laſt united, (other parts being drawn from them) and by their freedom from thoſe parts, and union, become

become more vigorous, and will not be idle; but ſince they cannot be imployed, drawn by, and adjoyned to other parts; they will ſet themſelves to work, and falling to their proper place, the loweſt region of the Sprig, collect themſelves in the ſame method they ſhould have done in the root, to which they ſhould have been adjoyned. And there finding the bark ſoftned by the external moiſture of the Earth, and fitted to give way to them; being thus ſetled, they thruſt forth themſelves into the Earth; from whence they extract cognate juice, with all ſorts of Atomes fit for the augmentation and nouriſhment of themſelves, & the whole Plant. And thus grows up a Plant of the ſme kind wth the old ſtock.

The 2d is performed by theſe ſeminal Atomes reſiding in the top of the root; wch part being ſeparated, acts in the ſame manner as it did in the whole Plant.

The laſt ſort is by Atomes, ſelected from this juice, when the Plant is

grown to his full bigneſs, and wants no more for his further growth at that time, and laid up together in convenient receptacles: which is a more perfect operation of Nature then the two former are.

In the former waves, theſe Atomes lye confuſed in the juice; and are not ſeparated, but by the parts to which they are to be adjoyned. But in this, theſe Atomes are methodically repoſed, and laid up in ſuch forms, as they appear to be a very Plant, incloſed within a skin, with ſuch leaves as they diſcover themſelves with, at their firſt breaking the Earth. The Atomes belonging to the root, the ſtalk, the leaf, are all laid together, and ſet in their right places, and make up a perfect Plant, the very ſame which firſt comes up out of the Earth. If the Seed be great, they are eaſily diſcovered. In the ſeed of the Aſh, the skins being removed, in the middle of the kernel ye ſhall finde two white tender leaves

lying

lying one upon another, with a ſtalk reaching to the point of the ſeed, (not that which is faſtned to the tree, but the other) to which is looſely adjoyned as it were, a navel ſtring from the ſtem, conveighing nouriſhment to this young Plant, while it is upon the Tree: as in the third Figure of the firſt Table is delineated. In the Maple, both greater and leſſer, though the ſeeds be winged as the Aſh, yet theſe ſeminal Atomes or this young Tree, is incloſed in the round knob; within whoſe tough and harder skins, is found a ſtalk and two leaves rowled round together, which are the very ſame that firſt comes up: as in the ſixth Figure is diſcovered. In Beans and Peaſe, betwixt the kernel, you ſhall finde thoſe very leaves which firſt break the ground, with a ſtalk, whoſe end paſſeth through one of the thicker skins, and is contained onely within the outermoſt thin skin: as in the ſeveral faces of the fourth and fifth Figures is deſcribed. Which if it

be any way moiſtned by an adventitious moiſture; preſently gives way to the ſwelling ſtalk and leaves, which when they are diſtended beyond the capacity of the outmoſt skin, break forth and ſhew themſelves. In other ſmaller ſeeds, the leaves are inclos'd and rapt round, the ſtalk lying betwixt them; as in the Cabbage and Radiſh ſeeds; figure the ſecond. But when they break through the ground, they erect themſelves upright, ſometimes carrying the hard skin up upon their tops. The greater ſeeds have, beſides theſe ſmall plants, a ſubſtance which we call the kernel; unto which their ſtalk is faſtned, neer about the middle of them, by two ſhort ſtalks; from which ſubſtance they receive nouriſhment, while they are incloſed within their skins, and matter afterwards for the diſtention of the ſtalk and leaves, after they have enlarged their territories, both upwards and downwards, in root and leaves: as in Beans, Peaſe,

Wheat,

Wheat, Barley, Acorns, whoſe parts turn into a milky ſubſtance, fit nouriſhment for theſe tender Plants. That theſe ſeminal Atomes do conform and diſpoſe themſelves likewiſe, according to the ſame method they did, or ſhould have done in the Plant, whoſe they were, or for which they were prepared for nouriſhment, will eaſily appear by that artificial generation of Plants, which not onely caſually hath faln out, but by many hath ſtudiouſly been effected. When from the powder or liquor of Plants, (as is related by *Libarius*, and others, I need not name the Authors being ſo common an experiment) they ſhall again be recalled to live, and ſtart up ſtalk and leaf; which but now was duſt, or liquor. I ſhall onely relate one experiment caſually, though twice made by a learned grave Phyſitian, neerly related to me: which will explain the manner of this operation to the full.

Having in the evening expos'd a

decoction for a cliſter (made of Violet leaves, Strawbery leaves, Mallows, and the like) to the cold of the night. The next morning he found it covered with a ſlender cruſt of Ice, which gave him leave through it to behold in the Water, the leaves in their perfect ſhapes, of all thoſe Plants, of which the decoction was made, both in faſhion and colour; which remained in that poſture till the Ice was broken; which was no ſooner done, but all thoſe fictitious Plants preſently vaniſhed, nothing remaining but the cleer liquor of the decoction.

Now how this could be performed, unleſſe it were by the union of theſe ſeminal Atomes diſperſed in the liquor; (drawn from the other parts, by the gentle heat of the Fire acting with the Water) diſpoſing & ſetling themſelves in their right and natural places, will appear impoſſible. How could a ſlender heat in ſo ſhort a time give a form, or ſquare out ſuch a matter into that figure

figure which but now it loſt? or why when the matter is thus faſhioned, ſhould it not retain that figure and bulk when the incloſure is broken? We muſt therefore conclude, that theſe ſeminal Atomes of the Plants, which were ſeparated from the other parts by decoction, and by the ſudden cloſure of the Ice intercepted from flight; were actuated by ſome remaining particles of heat, and put in minde of their office and nature; inſomuch that every Atome began to ſeek out his proper ſituation and neighbour, to ſettle themſelves in ſuch method as they held one towards another, before they were parted from the Herbs, and ſo make up perfect Plants both in figure and colour. But the Ice being broken, and the liquor moved, theſe appearing Plants, being made of ſuch fine ſpiritual parts without cement; were ſoon ſhattered into their firſt indiviſible particles; which being again diſſolved, and the order broken, could not be by the ſenſe diſcerned.

The reaſon why theſe ſeminal Atoms could not then conſtitute a perfect ſolid Plant, was, becauſe there was wanting ſome other more fixt parts of the ſame nature, and condition, with theſe more ſpiritual, to conſerve them in that poſture, and to cement them together; to fix and harden them into a conſiſtence. Theſe are of the ſame nature, particles belonging to every part, Atomes of Leaves, Stalks, Flowers, Fruit, and Root as the others; but are groſſer, more terreſtrious, which cannot act themſelves; but give ſolidity, ſtrength, and hardneſſe to the other when they are joyned together; and are ſo exactly united with them, when the Plant is entire; that they cannot, but by diſſolution of the whole, be diſtinguiſhed. Theſe in this decoction, were left behinde in the expreſſed Stalkes, Rootes, and Leaves, and therefore the Plants were not permanent.

The

The consideration of these two parts in the constitution of a Plant, will give us a light of the cause of the diversity of the Sexes in Animals; whose way of generation follows next.

How Animals are generated.

Chapter the Seventh.

THe generation of Animals is as various almost as their several Species; whereof some derive their Pedegree from the corruption of Dirt, Mud, and other Animals; some arise from the funerals of Plants, and start up a moving sensitive piece, which but now grew a vegetable. Others again of a more noble Progeny, owe their beginnings to some seminal parts derived from the Genitors; but reposed in certain vessels excluded from the Females, and left without the sphear and guidance of their forms; such are all births

births breaking forth from the inclosing walls of Eggs. The more excellent Animals after their formation, are contained (till they acquire some degrees of perfection) within the precincts of one of the generators. All which, or the most of them, I shall prosecute in the following Discourse.

The first rank of Animals arising from corruption of other creatures (as Eeles from Mud; Flies and Wormes, from Beasts; the Scarabeus from Oxen; Lice from the filth of most Creatures.) These I say, grow up upon the mutual juncture of such Atomes, which before lay scattered in the bowels of some other compound; and wanted nothing but union, to fashion them into such a frame and structure: which, as soon as possible they can obtain their freedom, put themselves in rank and order, and become another living thing, differing from that Species whence it had its birth. This is seen in the Misselto, which grows upon

on other trees, very evidently; the juice which nouriſheth and conſtitutes this Plant, is drawn from the Earth, with the juice belonging to the other tree it grows from, and is perfectly mixt with, not to be diſcerned from it; till after long circulating about the ſeveral parts of the tree, it is refuſed by all, as unfit for them. At laſt uniting in ſmall lumps, they diſcover their differing natures, by parting from the parts of the tree, and when they are in ſuch a proportion united: thruſt out thoſe ſtalks, and leaves. and fruit, which we call Miſſelto. Theſe particles of the Miſſelto may be diſcerned united in ſmall lumps, a good way from the eruption out of the tree; where ye may finde many ſmall green drops, as it were, hardned, incloſed in whiter wood of the other tree. So theſe ſeminal Atomes, taken in with the ordinary nouriſhment of thoſe creatures, are carried up and down through their parts; but received of none,

none, to be perfectly united with any; but being diſpers'd in ſmall parcels, they cannot eaſily unite themſelves, till a greater portion of them be met together; wch generally is at the Spring, when the Suns heat begins to contribute vigor to them; and diſſolves the excrementitious humors of the Body they are incloſed in; ſo that they much eaſier obtain their freedom, and ſo uniting themſelves in their proper method, and order, become ſuch creatures as thoſe Atomes can fitly conſtitute. Theſe Animals too, ſometimes alter their external forms, and become another thing then what at firſt they ſeemed to be; as from a Worm, the next advancing Sun ſalutes a Butterfly; ſuch is the growth of all Inſects, which appear firſt to be Worms; the Tadpoles grow to be Frogs; the ſpitting or eggs of Flies, to be Worms, and then Flies again; which is cauſed by the addition of new parts, which they themſelves procure from their nouriſhment;

nouriſhment; by which theſe parts become larger, ſolider, and ſo diſcernable, which before could not be ſeen. As the germen or young plant in the ſeed, when it hath obtained a new ſtock of moiſture and nouriſhment, puts out leaves of a differing form from thoſe which firſt come up; as the Maple, Borage, Cucumber, and almoſt all plants differ in their ſecond leaves, from their firſt, which manifeſtly appear incloſed in the ſeed. The other are ſo ſmall and wrapt up, that until there bee new parts adjoyned from their nouriſhment, they are not diſcerned.

Theſe imperfect Animals ſpring not up alike indifferently, from all Bodies; ſome Animals being made of one kinde of Matter, ſome of another; ſome Plants retaining the ſeminal Atomes of one Inſect, ſome of another; ſo that from one Plant or Animal ariſeth one kind, from another, another. I ſhall not ſtay to look out their ſeveral originals.

The

The way how thoſe Creatures are generated which owe their beginnings to Eggs.

Chapter the Eighth.

THe other two more perfect generations, are made by the conjunction of theſe ſeminal Atomes, extracted from both generators: who both of them contribute ſuch Atomes, as being laied together in their proper places, would conſtitute an Individium of that Species. One of which incloſes and layes up theſe united ſperms, with a proportioned quantity of nouriſhment, for the growth and perfection of the Fætus, in an Egge. From which all Fowles, moſt kindes of Fiſhes, Snakes, Spiders, Frogs, and ſome other Creatures are brought forth. This Egg is compos'd in the Matrix of the Females, and is the product of theſe ſeminal Atomes ſelected from the nutrimentall juice

juice of both; the Femal adding thoſe parts fitted for the growth and nouriſhment of the Fœtus, from her own blood. The yolk, the groſſer aliment, is compoſed in the Vitellary, or Egg-bag, ſelected from large veſſels immediately ariſing from the Aorta. The other part, the White is made in the Matrix, by a certain milky viſcous exudation, flowing from the rough wrinkled membranes of the Womb; whoſe property it is to convert that blood, which by ſeveral great veſſels is brought to it, into that milky ſpermlike ſubſtance.

Beſides theſe ſeminal parts there is (I ſay) a contribution of nouriſhment conveighed with them in the ſame Egg, for the nouriſhment and growth of the Fœtus, while it is incloſed in thoſe walls. And this is, as I ſaid, of two ſorts, agreeable to their double uſe, fitted for their nouriſhment while the Atomes are uniting, but tenderly cemented, and growing together: and this

this is the White, which is more agreeable to the nature of Sperm; and anſwers to the Mothers blood, which gives growth and nouriſhment while the Fœtus lives in the Mothers womb.

The other, the Yolk, of a more ſolid and confirmed ſubſtance, is for its nouriſhment when it hath atchieved ſome perfection and growth; the parts then expecting a more ſolid nutriment. This ſupplies the uſe of Milk in other Creatures, who for a time after their excluſion are nouriſhed altogether by it.

Both of theſe, White and Yolk, are incloſed in Membranes; ſome of which being hardned into a ſhell, are excluded from the Femal daily as they grow to perfection. And that becauſe ſuch ſmal bodies as theſe Ovipara are, cannot contain ſo numerous a progeny together, as their fruitful wombs do yearly diſcloſe.

In which none of theſe parts, either White, or Yolk, theſe ſeminal Atomes

are

are repoſited, is doubtfully related. Some affirming them to reſide in the Center of the Yolk. But this will eaſily be rejected, when ye ſhall ſee the whole Animal framed, and the Yolk yet entire, whole, incloſed within its own membrane: onely ſome ſmall threadlike veines full of blood ye may ſee thruſt into it, conveighing ſome of it, as nouriſhment, to the Fœtus.

Others think the White to be that, of which the Chick is framed and faſhioned; but not rightly neither; for that likewiſe is to be ſeen whole, when the body is formed.

Fabritius, who hath taken a great deal of pains in diſſections, a ſtrict enquirer into Natures ſecrets, eſpecially concerning the manner of Generation, ſuppoſes theſe parts to reſide in the Chalazæ: that part which by our Women is called the treddle. But this likewiſe is falſe, for then every Egg ſhould produce two Chickens: there being one treddle at each end of the Egg; which

ſerve for no other end, but for ligaments to contain the Yolk in an Equilibrium; that it might not by every moving of the Egg be ſhakt, broke, and confuſed with the White. What therefore I have often obſerved I ſhall here diſcover, and in it the true manner of their formation.

Fabritius makes mention of a little white Circle, or Cicatricula on the thin Membrane of the Yolk; which he ſuppoſes to be a skar, left by the breaking off from the foot-ſtalk, by which it was faſtned to the Hen, before the White grew about it. But if ye further obſerve it, ye ſhall finde it another thing. *Pariſanus* would have it to be the ſeed of the Cock. I think it to be the ſeminal Atomes derived from both, here repoſited; as the following Obſervations will diſcover.

In the Hen, while all her Eggs are but Yolks, or ſmall little grains contained in the Egg-bag, or Vitellary; ye may perceive this white Circle or Cicatricula

Cicatricula, which afterwards, as the Yolk increaſeth to bigneſſe, doth appear more evidently.

When the Egg is perfect, if you break the ſhell at the bigger end, you ſhall finde this Circle in all prolificial Eggs; the faſhion of it you may ſee in the firſt Figure of the ſecond Table, the innermoſt Figure, A.

This Cicatricula after the firſt dayes incubation, you ſhall ſee dilated and grown wider, as in the firſt figure at B. with a little white ſpot in it, eaſily to be diſtinguiſhed from the reſt.

The ſecond day being paſt, in the third day ye ſhall finde it ſpread yet larger. I have ſeen it enlarg'd to the breadth of a Sixpence, diſtinguiſhed with ſeveral Circles within it, exactly round, repreſenting the Eye. The outmoſt round was of a much paler yellow colour then the reſt of the Yolk, and of a thinner conſiſtence, as if it had bin by the heat of the Hen diſſolved & melted. Within this was a leſſer Cir-

cle of a moſt reſplendent cleerneſs; through which did paſſe ſome ſmall white threads into the outmoſt pale circle. This inner clear Circle was of a ſubſtance like to the white of the Egg, but clearer, and very fluid. Within this clear round, was another of a pale yellow, like to the firſt; which incloſed another transſlucid Circle within it, in which was a clear ſmall Body, but ſomething obſcurer then the incloſure, containing in it a little whiter ſpot, eaſily to be diſtinguiſhed from it: which ſeemed to be center to all the incloſing circles. This you may ſee in the ſecond figure of the ſecond Table. The inner white Circle and ſpot in the after diſcoveries, will be found to be the Carina and heart of the Chick. The two clear Circles to be that liquor, or humor, in which the tender Atomes of the Chick, while they are collecting and conjoyning, do ſwim in; that by external motions they might not be diſordered and hindered from union,

on. The middle yellow was ſome of the ſame matter, not yet diſſolved into that clearneſs. The outmoſt yellow Circle was ſome diſſolving by the heat of the Hen, and preparing for the making of blood, from which it now differs onely in colour; which the next day or the day following will appear in thoſe ſmall threads, conveighed to the white ſpot within: which the fourth day ye ſhall finde filled with this blood, and moving.

Towards the latter end of the third day, your ſhall finde this Cicatricula to be all clear in the middle Circles, the yellow being obliterated; and now remains onely the white Circle and ſpot in the middle, ſomewhat enlarged, circumſcribed by a larger reſplendent Circle; environed with the outermoſt yellow round; in which, by the help of Glaſſes may be diſcovered the ſmall veſſels coming from this diſſolved yellow matter, from every ſide to the middle of the white Circle; which by

a Microscope appears now to be the Carina or back and neck of the Chick, and the heart in the midst of it: this is delineated in the seventh Figure of the first Table.

On the fourth day, this Cicatricula was spread the full compasse of the big end of the Egg; the outmost Circle whereof, was filled with veins variously spread abroad, and Arteries, as might be supposed, (though by their coats not to be distinguished,) because their Anastomases were evident; which being collected into four trunks from the opposite points, passed through the refulgent clear Circle to the middle or center. Without the extream limbe of this pale yellow Circle, were no vessels to be seen.

Within the white Circle in the middle, which was much dilated too, appeared a red sparkling line encompassing the white spot, now red too, and moving: whose motions plainly shew, it was the heart; as afterwards I saw by

by the help of a Microscope, exactly shewing me the heart perfectly fashioned, with both his ears, and this red line joyned to it, running quite round in the inside of the white Circle. By the help of this Glasse, I saw the motions of the heart and ears for a long time; one anticipating the other, and continuing after the others decay. When the hearts motion was almost spent, the ears contracted themselves in due order, and after five or six pulsations of the ears, the heart would move once, and then rest again, till after such a number of pulses were performed by the ears.

The heart when it had emptied it self, by its continual pulsation, of all the blood, and was become perfectly clear, and transparent as before the blood came to it; moved a long time after, observing the same order, following the pulsation of the ears, as when it was watered from that bloody Fountain.

This Glaſſe ſhewed me the head too, conſiſting of three bubbles as it were; whereof one confeſt it ſelf to be the eye, by the manifeſt diſcovery of the Pupilla in the middle. From hence the Spina was carried round almoſt to the head again, which is that tranſparent white Circle without the red line. From whence appeared ſome ſmall obſcure clouds, faſtned in the proper places of the wings and thighs: which in the fifth dayes obſervation, appeared to be ſo indeed, without the help of Glaſſes. Beſides, from this Carina, were drawn ſome ſmall ſtreamings, which were the rudiments of the ſucceeding ribs This fourth dayes obſervation may be ſeen delineated in the third Figure of the ſecond Table.

The fifth dayes this tranſparent clear body, together with the Fœtus ſwimming in it, ſunk lower to the ſide of the Egg, then in the day before; and what was then clear and tranſparent, begins now to thicken and grow obſcure,

ſcure. The head is beyond its proportion grown, outſtripping all the reſt; as if Nature made haſte in finiſhing that part, of which ſhe ſhould have moſt and ſudden uſe. The eye grown almoſt to its perfect bigneſſe, and diſcernable in all its parts, the greater diviſions of the brain, and Cerebellum eaſily to be ſeen. The Carina or Spine diſcovers it ſelf encompaſſing the red line or Vena Cava, which was now ſcarce diſcernable by reaſon of that clothing it had by this dayes addition, procured: the heart too, obſcurely covered, almoſt hid from view, excepting a little in the forepart, which ſeemed open, or at leaſt not ſo much hardned as the other, but continued tender and cleer ſtill. The wings and legs eaſie to be obſerved, without Glaſſes, being much whiter then the reſt. The bulk of the body hardned into a viſible form and obſcurer then before, yet not ſo darkned, but that the pulſation of the heart being red with blood

blood might be discovered through it: which after it had layen still for three hours at least, I afterwards layed it in the Sun, whose vigorous heat renewed its life and motion again. This thin body being opened, from the great vein might be seen some rudiments of the Liver, some small puttings forth of vessels, which had some blood between them hardned. This fifth dayes observation you may see in the fourth and fifth Figures of the second Table.

The sixth dayes observation shews every part more distinctly, and what before even by the help of Glasses seemed but darkly adumbrated; now begin to confess themselves by their visible shapes and actions. The three bubles of the head are much enlarged, the eyes perfected, the wings and legs grow out: the heart appears fleshy and corpulent, the rudiments of the Lungs, Liver, and Guts, appear more clearly.

The seventh day shews all more perfectly yet, and it now appears in the shape

ſhape and figure of a Chick, perfectly accompliſht with all its parts; wanting nothing but confirmation and hardning, which every day now increaſes, to the diminiſhing of the white; wch about the tenth day is done: there remaining little more then that thin clear liquor the Chick did ſwim in: the yolk entire, and appearing bigger then before; being rarified, and as it were diſſolved, by the heat of the Hen: and brought into a fit condition to be by the continuing heat reduced into blood, obtaining from that gentle Furnace colour, and fluxibility. After which time there is little obſervable till the fourteenth.

About the fourteenth and fifteenth dayes, the beginnings of the feathers appear, the skin being covered with little black ſpots, which are the roots of the feathers. The skull begins to cover the brains. The umbilical veins plainly diſcover themſelves: of which the firſt that was ſpread through the white

white of the Egg, passes through the upper part of the Liver, perforating the Vena Cava, near the basis of the heart. The other coming from the yolk insinuates it self into the Vena Porta, in the lower part of the Liver. Which shews what difference Nature hath made betwixt these two liquors: the one, the white, concocted and fitted for present use, is carried immediately to the Vena Cava and to the heart, to be distributed into every part for their encrease and nourishment; out of which every part might select cognate and appropriated Atomes, separated from all excrements, for their augmentation and nutrition

As soon as this is done and spent, because the Fœtus is not yet strong enough to seek his own nourishment abroad; neither is the Hen able to provide for it: Nature hath ordained another reserve of provision, which though it be not so fine, yet having another Cook to dresse it, the Liver being

being now perfected, it will by undergoing another dreſſing or concoction there, be made fit for the nouriſhment of the now hardned and confirmed parts of the Chick. And therefore Nature ſends what is melted and diſſolved by the external and internal heat, from the yolk to the Liver, by the Vena Porta, to be there dreſt and cookt again. From whence ſome excrements are ſeparated, as by the fulneſſe of the Gall, and the green excrements in the guts may appear.

To theſe two venal Umbilical veſſels are added two Arteries, ariſing from the Lumbary Arteries. Which accompanying the veins throughout the white and yolk, make a perfect circulation here, as well as betwixt the Mother and the Fœtus in Viviparis: by which means the new concocted blood mixt with this, is without trouble or danger brought to the Fœtus.

And therefore it is (I ſuppoſe) that the heart ſo ſoon before any other part

part performs his office; that by his continual motion, driving that dissolved clear liquor, (which is found in and about his vessels, and melted by the external heat) and forcing it into the white, may melt and dissolve that too, and make it fluid, apt to be carried along with it, returning in other vessels back to the heart, where it receives new vigor, and an addition of heat. By this means the liquor being increased, the vessels are not large enough to contain it; and therefore the heart thrusting it forth with the same continued violence, hourly drives it further into the white first, and afterwards into the yolk; where it still melts more, and the dissolved circle is still enlarg'd; as by the daily observations will appear.

After this time you shall finde the white clear liquor, in which the Chick did swim, consumed too; and the Fœtus lying on the yolk, & entire yet, as on a pillow. Whose outward mem-

brane

brane being either united to, or elſe the ſame (which is moſt probable) that cloſes the Chicks belly, and indeed clothes the whole Chick; holds now both yolk, umbilical veſſels, and guts altogether. And as the yolk daily leſſens by the growth and increaſe of the Chick; this membrane is contracted, and the guts with the yolk by degrees are drawn up into the belly, and cloſed up by this skin; where a portion of it may be ſeen after the Chick comes abroad, if by diſſection it be enquired after, and ſerves to nouriſh it, even after it is diſcloſed. So that in theſe creatures there is no footſtep or ſigne left of the Umbilical Veſſels, or Navel ſtring, as in others; but both veſſels and nouriſhment are incloſed within the belly of the Chick: A figure of the Chick thus formed, ſome few dayes before his excluſion, you may ſee in the eighth figure of the firſt Table.

And now the Chick is perfectly fitted to come abroad, and ſeek his own proviſion;

proviſion; and indeed it is almoſt time, having ſpent his patrimony, he muſt now ſeek other food: Being ſtraightned likewiſe within the priſon of the ſhell, and wanting now the air to breathe in; for the allaying that heat which now the moiſture being ſpent) begins to enflame: and hath ſo dried the ſhell that it becomes friable, by his continued ſtrugling and turning round, with his ſharp beak from under his wing, he breaks through thoſe walls, which now impriſon him, and were before his Caſtle, exactly dividing the ſhell in the middle.

From theſe obſervations of the daily progreſſe of the Chicks increaſe, we may ſee the manner of their generation which muſt be in this ſort. The ſeminal Atomes conſtituting the Fœtus, collected from the blood by the teſticles, and joyned together in the womb or vitellary; contract to them from the femal blood that round body which ſerves afterward for their nouriſhment,

(as

(as I have related) the yolk, which from ſeveral ſmall threadlike veſſels, receives nouriſhment from the blood, until they come to their accompliſht bigneſſe. On which (as I have ſhewn) theſe ſeminal Atomes being fixt, by the former obſervations you clearly ſee, how they daily grow up into a living thing of the ſame ſpecies. And this ſeems to be as the Germen or little plant repoſited in every ſeed; wch grows up to a bigneſſe not to be contained within the skins of the ſeeds, but breaks through that and the earth that covers them; and then ſhews themſelves in a viſible form and bulk, which before could not, but by the curious obſerver, be diſcovered.

This Cicatricula in the ſmall grains in the Vitellary, ſeems to be, nay are the ſame ſeminal Atomes, diſpoſed in their due method and places which they obſerve one towards another; as when they appear in a more viſible bigneſſe afterwards. For before they are ſate

on by the Hen, there appears in this Cicatricula some distinction of parts; there is a little white spot, in the middle of a white circle to be seen; which particles never vanish, but grow larger still, till they discover themselves what they are. The middle spot is found to be the heart, the white circle becomes the Carina or Spine; at the end whereof, three or four dayes incubation shews the head; and so the rest of the parts as Nature hath need of them, grow up to their offices in their visible figures. So that these seminal Atomes as soon as they are conjoyned in a convenient place, by the due ordering and regulating of the specifick soul, put themselves in order, fall to their proper places, and make up a Chick before the Egg be perfected. As the germen in the seed of a Plant (as I have shewn is perfectly fashioned in the seed, though it discovers not all its parts, till by addition of new particles, they grow to a bigger bulk, and become more visible. The

The firſt work that is performed by the Hens heat in incubation, is a diſſolving and melting as it were of the finer and more ſpirituous parts, which are moſt ſenſible of the firſt and leaſt heat; by which means the ſeminal particles are cleared and ſeparated from other parts; and thoſe finer parts appointed for his firſt nouriſhment, are clarified, melted, and made fluid, and apt to be moved and diſperſed by the white ſpot or heart.

And this is the true way of generation of theſe Creatures; whoſe eductions, as well as thoſe of Plants, our Author brings as inſtances for his equivocal generations. Which as they fail his expectation of clearing thoſe accidentall cauſes, he ſo much depends on: ſo they clearly ſhew, that as in the ſeed of a Plant, there are actually ſuch parts repoſited, as do make up a Plant perfectly formed. So in an Egg before incubation, where both ſeeds are conjoyned, the parts of a Chick are orderly

derly diſpoſed, by the conjunction and regular diſpoſure of theſe Atomes; which while they were parts of the blood, ſerved for the nouriſhment and increaſe of that body from whence they were taken, but now ſerve to make up another Individuum of the ſame ſpecies.

Of the generation of Animals that are brought forth alive.

Chapter the Ninth.

I Have been ſomething the longer in explaining the former wayes of generation, becauſe as their diſcovery is eaſier; ſo they more plainly illuſtrate the way and method of Generation. Which, how fitly it may be applyed to thoſe that produce living births, in this enſuing diſcourſe ſhall be examined.

Theſe, as the former, are the iſſue of a double Sex; and onely differ in this, that they are incloſed in the female, till they are perfect. I ſhall not here ſtand

in the examination of that doubt, whether or no the femal contributes any ſpermatical particles, towards the formation of the Fœtus, in Coition. When we ſhal obſerve what parts Nature hath beſtowed on the females; I mean teſticles, (for ſo they are, and not glanduls for I know not what uſe;) to which are derived Arteries and veins, of the ſame original with thoſe diſtributed to the Maſculine ſtones: and when in theſe teſticles ye ſhall finde ſpermlike matter, and veſſels from them to the womb. When alſo in coition ye ſhall obſerve the ſame delight and concuſſion as in Males; why ſhould we ſuppoſe Nature, beyond her cuſtome, ſhould abound in ſuperfluities and uſeleſſe parts.

The principles therefore of theſe living births, ariſe as the other, from ſome ſelected Atoms by the teſticles of both, thrown into the Matrix of the Female. Where being united & mixt by the fermenting heat of the womb: the ſeveral Atomes fall to their reſpective places:

the ſoul playing the skilful Workman, (not laying brick where ſhould be morter) repoſing every Atome in his proper place, that very ſame which it ſhould have held in the body, from whence it was ſeparated.

While this is doing the tenacious part of the ſperm, in which theſe Atomes were laid up, is now hardned into membranes, incloſing ſeveral ſubſtances; the one incloſing the pure ſeminal Atomes which are in faſhioning themſelves, in a clear tranſparent liquor as in the Egg; the other incloſing both that, and the other parts of the ſeed from which theſe Atomes are enlarged and nouriſhed.

This outward Membrane, ſticking to, and about thoſe aſperities, or papillar extuberancies, which are cauſed by the orifices of Arteries, and Veins opening into the cavity of the womb, gives way to the gently diſtilling blood, to deſcend to theſe Atomes; to furniſh them with ſtore of cognate parts, to be

be ſelected by, and added to them for their future growth.

But that theſe yet tender parts, may not be overwhelmed with too great a flux of blood, and be ſtifled with too much nouriſhment, before they are able to diſpoſe of it: (a frequent cauſe of abortion) Nature ſuffers it to wander through a Labyrinth of an infinite number of veſſels, diſpers'd through this outmoſt membrane; from whence by one chanel it is conveighed to this new Animal. But not to remain all of it, within the limits of this little frame; but being conveighed to the heart of the Infant, by its continuall motion ſome is thrown into every part, according to the capacity of their veſſels. And becauſe all parts of this too, are not fit for the repair of theſe young Atoms, but do require a greater choice; therefore at every motion of the heart, ſome of this blood is thrown out of this Infant, by appropriated Arteries, back to the Mother again. So that by

this continual circulation of the blood, through this new Animal; freſh and cognate moiſture is ſupplied to irrigate, and augment every part of it. From whence, as at the firſt, cognate Atomes are ſelected & adjoyned to every particle, until the Fœtus come to perfection; and then breaking through thoſe membranes, it is brought forth a living creature.

It will be requiſite I ſhould here ſatisfie a doubt, which may perhaps perplex ſome in the receiving this opinion of generation, *viz.* why there ſhould be a diſtinction of Sexes? and why there ſhould be a collection of theſe ſeminal Atomes by both Sexes? and that without the admixture of both theſe, there could be no generation?

The reaſon why there are diſtinct Sexes, is, becauſe one of them muſt ſupply the part, and office, that the Earth doth to Vegetables; which is, to contain, preſerve, and ſupply it with fitting

fitting nouriſhment; which is done by the Female. But why cannot all bee done by this one? what need is there of another ſeed?

The uſe of theſe differing ſeeds, is evidenced in the former diſcourſe of Plants: where I ſhewed you, that theſe ſeminal Atomes were of two ſorts, ſpiritual, and more material; whoſe duty was to fix and cement the ſpiritual Atomes together, that they might mutually cohere the one to the other; the Maſculine, are to actuate, enliven, and to act for all the reſt: and this diverſity of Atomes, makes a difference in ſeeds, and a diſtinction in Sexes. The Maſculine ſeed having undergone concoctions and ſeparations by a greater, and purer heat, becomes more ſpiritualiz'd. & ſubtile; and is like to thoſe ſpiritual Atomes of the appearing and riſing Plants out of the ſpirits of a former Plant corrupted, as I before declared. Which contains in it all parts fitting to conſtitute ſuch a body,

body, as that was from whence it was taken: and being thrown into a convenient place, where it may have room and agreeable heat, would by the diſpoſing of every Atome into his proper place, conſtitute a perfect body. But not being furniſht with thoſe more material particles, it would ſoon vaniſh (as the appearing ſuppoſititious Plants did) theſe ſpiritual Atomes not being cemented and conjoyned together.

The feminine ſeed being extracted after the ſame manner, from the ſame veſſels, by the female teſticles, containing the ſame particles, but cruder and leſſe digeſted, from a cruder matter, by leſſe perfect Organs, is left more terrene, furniſhed with more material parts; which being united in the womb, with the ſpiritual particles of the maſculine ſeed; every one being rightly, according to his proper place, diſpoſed and ordered with the other; fixes and conjoynes thoſe ſpiritual A-

tomes

tomes, that they still afterwards remain in that posture they are placed in.

I shall forbear the prosecution of this any further, having sufficiently cleared the wayes of generation of perfect bodies. I shall proceed to shew the causes of similitude in the Fœtus to the generators, and of mutilated and imperfect births.

How different Sexes, and similitude of the Fœtus with the generators is caused.

Chapter the Tenth.

THe conjunction of these seminal material Atomes of both Sexes, causeth this similitude of parts, and marks, with the parents that begot them. For according to the exuberancy, or power of the Atomes of either Sex, so is the Fœtus fashioned and distinguished. If the Atomes constituting

ting the Maſculine parts prevail, then is a Male generated: but if the Atomes of the Females ſeed prevail either in quantity, or energy, over the Maſculine; then is the product a Female: and thoſe Atomes which were ordained for, and belong to the Maſculine parts, being but few in number, and leſſe in power, are obſcured, being ſcattered amongſt the reſt, or elſe being of no uſe, and having no parts to joyn with them, to unite and cement them together, are quite loſt.

This is the cauſe too, why the Fœtus or Infant hath parts, ſome reſembling the Father, ſome the Mother, having ſometimes the Mothers Lip, the Fathers Eye, &c. according to the prevalency of the reſpective Atomes.

Beſides, by how much the more the Maſculine Atomes abound in a Female Infant; by ſo much the more the Fœtus is ſtronger, healthier, and more Manlike, a Virago. If the Female Atomes abound much in a Male Infant, then is that

that iſſue more weak and effeminate. If either parent hath any extraordinary Mark, or part more then uſual; as the Woman with ſix fingers; whom our Author relates to have born all her Females, with the like number of fingers: It is cauſed by theſe ſeminal Atomes extracted from the blood, carrying along with them Atomes belonging to every part, communicated to the ſeed, and ſo to the Infant; eſpecially if the Atomes, in which theſe ſupernumerary parts or marks reſide, prevail over the reſt. As the example of that Woman illuſtrates, who brought forth all her Males with the uſual number of fingers; all her Females with ſix upon an hand, like her ſelf. The Sex ſhewed the prevalency of her ſeed, which having the maſtery of the Maſculine, all the ſeveral Atomes contained in her ſeed, ſhewed themſelvs in the ſame poſture, as in her own body. In the Males, thoſe particles of her ſeed being weaker, ſerved onely to cement the maſculine Atomes, and no more.

The

The cauſe of defect of ſome parts, or an ill diſpoſition of them in places they ought not to be in; may be from the avocation and diſturbance of the imagination of the parent, at that time when theſe Atomes are in diſpoſing and ordering by the ſoul of the Infant, in their proper places. This I ſay, is done by the imagination of the Mother diſturb'd, repreſenting to the Infants ſoul, then diſpoſing and ordering theſe Atomes, either ſome other pattern by which it conforms its work; or elſe wholly calling it away from that operation, ſuffers theſe Atomes confuſedly to unite and diſpoſe themſelves as well, as being diſordered, they may; and ſo make up a monſtrous kinde of birth. Or elſe the ſoul being diſturbed, and the Atomes diſordered; they joyn not to one another in their proper places, but the Atomes of the leg joyn with thoſe of the ſide, or the arm, or the head. Sometimes ſupernumerary particles are found in the ſeed, which

which being many and prevalent, do unite themſelves, and joyn to ſome others, and there put forth; ſo that there are ſeen ſometimes two perfect bodies, conjoyned in one part or other; or four arms, &c. as ſeveral Hiſtories relate of ſeverall monſtrous births. That ſeen amongſt us of late years, being none of the contemptibleſt of that kinde. I mean the young man that had a head, arms, and legs of another body growing out of his ſide.

But here ariſes a great difficulty, how this diſturbance of the ſeminal Atomes, ſhould be occaſioned by the diſturbance of the Mothers phanſie? How the imagination works upon parts of the ſame body, Authors tell us, is by the mediation of humors and ſpirits: but how it ſhould operate upon theſe ſeminal Atomes, at this time, before there is any influx either of humors or ſpirits from the body to them? I cannot yet finde ſatisfaction from any.

I ſhould think it done by the mediation of the ſoul, traduced with the ſeeds. Which being of the ſame eſſence, and part (as I may ſay) of the Parents ſoul; it retains ſtill the ſame affections and paſſions that it had before its traduction. Hence the ſoul of the Mother being diſturbed, this ſoul of the Infant, by that conſent and harmony which is betwixt them, muſt be diſordered too: which cauſes that diſorderly concourſe of the ſeminal Atoms, and thoſe monſtrous births ſpringing from it: as I before declared.

Some Arguments againſt this opinion propoſed, and anſwered.

Chapter the Eleventh.

OUr Author brings in an opinion of Doctor *Harvies* to father his accidental formation upon, ſo much contrary to me, that I cannot baulk the relation

relation and examination of it, *viz.* That the ſeed of the Male, doth not remain in the womb of the Female in any ſenſible bulk: but (as it ſeemeth) evaporateth, and incorporateth it ſelf either into the body of the womb, or rather into ſome more interiour part, as into the ſeminary veſſels, which by mediation of the Females ſeed, ſuck up the Males ſeed, and turn it into a vapour, operating in ſuch ſort as our Author before relates, in the generation of Animals. And after a certain time, ſome ſix weeks, or two moneths, (as the Doctor obſerved in Does and Hinds) theſe ſeeds diſtill again into the womb, and by little and little do clarifie in the midſt, and a little red ſpeck appeareth in the midſt of the bright clearneſſe.

The right obſervation of this experiment (under favor) in my judgement was not truly made; for this inſpection into the wombs of creatures cannot be, but by diſſection; which muſt certainly hinder that ſecond work, namely

the returning back of the seed into the womb: And if so, how shall it come to our knowledge, that the seed, which at the time of accoupling, was received into the womb, and afterwards when the observation was made was evaporated, and attracted by the Females testicles, shall afterwards distill into the womb again; unless the same Female were preserved to make those distinct observations, at several times. I should rather believe the Does, or Hinds in whose wombs the Doctor found no sperm after the accoupling, were barren, and so never received the Masculine seed into their wombs or at least never retained it; or else had not then coupled with the Male. And that after the two moneths, he met with some others that had conceived, in which he found that resplendent clearness and red spot. All which will not amount to a considerable argument, to support this change of substances by accidental causes.

Not

Not unlike to this is that opinion of *Fabricius*, aſſerting that the ſeed of the Cock is not caſt into the womb of the Hen; but into the beginning of the Matrix, and there by an irradiating influx fœcundates the Hen, and makes fruitful all the eggs that ſhall for a long time after be produced, without any admixture of the ſeeds at all. This opinion of his is grounded upon the impoſſibility (as he ſuppoſes) of the entrance of the Males ſeed into the Females womb; the inner orifice being ſo cloſely ſhut, that from without it is impoſſible to receive any thing. Beſides in diſſection, he could never finde any part appointed for the ejaculating the ſperm into the womb. The Penis *or Prick* being wanting in the Cock; ſo the ſeed cannot be thrown further then the entrance into the womb.

Whether or no there be a preſent union of the material parts of the ſeeds, after every coition, which impregnates the Females; former obſervations

have not fully discovered. Those which are casually made by dissection of Females, at, or neer the usual time of coupling, may easily deceive us. For if nothing be found in their wombs then; we may as safely and conclusively argue, that either that Female never coupled with the Male, or never retained his seed as to say it is impossible for the seed to enter, because I never found it there The experiment ought to be made on some creatures, under the continual view of our observation; and presently after copulation, if we see nothing reflowing again; then to search where that seed lyes, will undoubtedly discover the truth to us.

That observation of Doct. *Harvies*, related to us by Sir *Kenelm Digby*, (though I confesse his curious eye, seldome takes any thing upon trust, or slightly passes by what is observable) seems to presuppose a conception; and on that supposition to ground his opinion, that the Males seed is not retained

tained in the womb, but evaporated; becauſe in his diſſections of thoſe creatures he ſuppoſed had conceived, (becauſe done at the uſual time of coupling) he never found it: till after, ſome two moneths, meeting with others whoſe pregnant wombes diſcovered ſome rudiments of a growing Fœtus; he concludes, thoſe creatures, he two moneths before diſſected, would have ſhewn then, the fertility of their wombs in the ſame manner. We may as truly argue (I ſay) they had not conceived, at the time of his diſſection; neither (had they eſcaped his knife) would they, without a new coupling, have had that red ſpot, in the midſt of that clear body.

But when wee ſhall conſider the great quantity of ſperm, emitted by the Male in every coition; and ſee that quantity retained by the Female, if by that copulation ſhe conceives; and finde no other part capacious enough to keep it, but the

womb: when we ſhall finde the material parts of the Male, copied out to the life in the Fœtus; even his marks, which never came under his ſight or knowledge peradventure, to be branded on the young one: we muſt needs acknowledge ſomething more then an irradiation, or fœcundating quality, impreſt on the womb by the Maſculine ſeed; and more then phanſie in the Females to produce ſuch effects. A Hen trod by a Pheaſant, though in a dark room, that ſo ſhe could never ſee his proportions or colour, brings forth Chickens, reſembling both her ſelf and the Pheaſant. A Bitch lined with ſeveral kindes of Dogs, though in the dark, where her phanſie could not operate to the aſſimulating of her births, brings forth her whelps faſhioned and coloured, like to all thoſe ſhe coupled with. The Horſe leaves ſome material impreſſions of himſelf, on the Mule, which he begets on the Aſſe.

That ſtrict cloſure of the wombs orifice

orifice in the time of diſſection, cannot exclude the ſeeds entrance. For wee know in the time of coupling in all Creatures, thoſe parts, all of them are much differing from themſelves, at other times, dilated, and ſwollen up by a more then ordinary heat, encreaſed by an extraordinary afflux of blood to thoſe parts, at that time. Which heat not onely increaſeth the deſire, but dilateth the cavities and pores: that thoſe parts will now be open, which before were ſhut. The Hen, and Does in coition elevate the Velabrum, which at other times cloſely ſhuts that paſſage. So it will be no marvel, if the ſtraight orifice of the womb in coition ſhall open, to admit that gueſt ſhe ſo much deſires; and moves it ſelf directly, to receive what is thrown into it by the Male.

As for his ſecond ground, that the Cock wants that part which ſhould ejaculate the ſperm into the Matrix: diſſection will ſhew us that, though it be

not ſo conſpicuous as in other creatures; yet at the termination of each ejaculatory veſſel, cloſe by the Orifices of the Ureters, may be ſeen ſmall extuberancies, which if compreſt will be diſtended to a greater length, emitting ſeed from their terminations. In coition we cannot but beleeve them much extended, as in all other creatures; which afterwards are flaccide and contracted. So that if we may believe diſſection (the ſureſt guide) we ſhall ſee Natures bounty to this creature; whoſe lalacity exceeding others, Nature hath beſtowd two parts, whereby he may ſatisfie his deſire. And indeed it was neceſſary ſo to be, for having no common receptacle, to receive the ſperm from both teſticles; as the Proſtata in other creatures: one Penis could emit but from one ſtone; therefore are there two, that in coition either by turns, or together, he may emit theſe ſeminal parts, from both teſticles. The defect of this part

part then will bee no argument to prove *Fabricius* his irradiation only.

I muſt here take away one ſtumbling-block more, which our Author hath laid in my way, in confutation of that opinion, favouring the actual exiſtence of all things, in all bodies. Which becauſe it may ſomething reflect on this my opinion of the way of Generation; I ſhall a little review it.

He to confute this way of Generation and nutrition, furniſheth us with an example to illuſtrate his Argument; which bears the weight and vigour of his Argument, and may ſeem very much to infeeble my foregoing Diſcourſe. Suppoſe (ſayes he) a Man, a Horſe, a Cow, a Sheep, and 500 more ſeverall Species of living Creatures, ſhould make a meal of Lettice: to avoid all perplexity in the Argument, let us allow, that every one did eat a pound; and and let us conceive another pound of this herb to be burned;

as

as much to be putrified under a Cabbage root, and the like, under five hundred Plants more of divers Species. Then caſt how much of every pound of Lettice is turned into the ſubſtances that are made of them, or that are encreaſed by them: as how much aſhes hath been made by one pound, how much water from another by diſtillation; how much a Man hath been encreaſed by a third, how much a Horſe by a fourth, &c. And when you have ſumm'd up all theſe ſeveral quantities, you will finde them much to exceed the quantity of one pound; which it would not do, if every pound of Lettice were made up of ſeveral different ſimilar parts actually in it, that are extracted by different ſubſtances of the nature of thoſe parts: and no ſubſtance could be encreaſed by it, unleſſe parts of its nature were originally in the Lettice.

In anſwer to this, we ſhall return this confeſſion, that if it were certain that

that all of ſo many diſtinct Species, that have altogether different parts one from another, did or could from the ſame quantity of one Plant or thing, receive a valuable bulk of nutriment; his Argument would remain exceeding valid and conſiderable. But when it cannot be made appear, that every one takes ſomething of the quantity, and is nouriſhed by it. Nay, when the contrary appears, that all are not nouriſhed by the ſame food: Some chooſing one ſort of meats, ſome another; one feeding on, and living by that, which kills another: this growing fat by that, which ſtarves another. It will appear that there is a choice and election of Atomes in that which nouriſhes, appropriated to the Species for which they are provided: and aſwell a ſelection of thoſe Atomes again, to conſtitute a new Individuum of that Species. In diſtinct Regions we finde ſeveral ſorts of Plants and Animals, which are the proper off-ſpring of thoſe

those countries; which are nourished by things peculiar to that countrey. If they be transferr'd, they either degenerate, or die, wanting their proper aliment; but seldome or never propagate their kinde.

Non omnis fert omnia tellus.

Besides, if it can appear, that many Species are fed with the same thing: it will be found likewise that they are those Species, that have many or most parts resembling one another. And then no doubt in the same aliment, they may every one finde particles fitly applicable to those corresponding parts: and no lesse able to constitute their members, then anothers.

It may yet be objected; If the seminall Atomes do so dispose themselves in their due and natural orders, as to make up a body resembling the Species; or at least to lay the first foundations, and rude draught, as it were, of a Body. Why are they not

not thus disposed, and setled in the seminal vessels of both Sexes, as soon as the sperm is made? There wants neither heat nor life to actuate them.

To this I shall answer; first, that perhaps if these seminal Atomes had convenient room in those vessels, they might be conjoyned in an orderly method. And therefore Nature hath so ordered these vessels, that the parts, both separating and containing these Atomes, should not be one continued cavity, as the Matrix is, which receives them in coition; but should be a glandulous and porous body; in which the particles or Atomes of the seed lie scattered, and parted one from another by the substance of the glandule. For first, these Atomes are separated by the testicles, a glandulous body; next, they are conveighed to the Prostata, a glandule too; in which they are reserved until the time of use. In the Ejaculatory vessels, their passage

paſſage betwixt the teſticles and Proſtata; though they circulate through divers Meanders, and Cavities; yet there they cannot rank themſelves in order, becauſe they are in continual motion, (the ſubſequent particles ſtill driving on the former) which hinders their conjunction: reſt being the Mother of Union. Thoſe ſeminal veſſels, which in diſſections are found joyned to the Proſtata, having many Cavities, and full of thin liquor, do not contain theſe ſeminal particles, but the Proſtata, (as I ſaid) and from thence in coition are they emitted. The liquor that is found in theſe ſeminal cavities, ſupplies perhaps (beſides that other in coition) the office of the thin tranſparent liquor in the Egg, in which the Chick ſwims, and by which the finer parts are nouriſhed at firſt, that is firſt concocted into the blood.

Beſides, theſe Atomes in their ordering muſt (I ſaid) be regulated by the ſoul, traduced with them; which is not

not faſtned to the ſeed, while it remains in the ſeminal veſſels, more then to the blood, or other humours in their chanels, on whoſe loſſe or preſervation the ſoul doth no way depend.

Neither in all emiſſions of ſperm, is the ſoul conveighed with theſe ſeminal Atomes, that in any place it may conſtitute a body. In all involuntary emiſſions, the ſoul is not communicated to the ſeed. But then onely, when the generators ſoul by a voluntary act, intent on propagation and multiplying her ſelf into another Individuum. diffuſeth her ſelf into the now parting ſperm, then only is it prolifical. Which coming into a convenient receptacle, where theſe Atomes may repoſe; being moved onely by that ſoul which accompanied them, and from which they received their orders and commands, are ſoon ſetled into their proper places, and become a perfect Individuum of that Species.

Thus have I diſcovered the wayes of generation;

Generation; which being cleared too of all thoſe doubts, that could be raiſed againſt it; will eaſily pronounce, that phanſie of our Authors, to be but the iſſue of an acute wit, not the birth of his maturer judgement. If in this Diſcourſe I have erred, I ſhall not marvel at my humane frailty, but hope to finde as favourable a Cenſure.

FINIS.

A DISCOVRSE OF THE Cure of Wounds BY SYMPATHY.

OR,

Without any real application of Medicines to the part affected; but especially by that Powder known by the name of Sir *GILBERT TALBOTS* POWDER.

By

NATH. HIGHMORE Dr. of Physick.

THE Sympathetical Cure OF WOVNDS.

THeſe univerſal and general Laws of Nature being laid down and rightly underſtood, the Cure of Wounds without Topical Application of Medicines, to the part affected, will ſoon appear an unqueſtionable Truth, and not a Magical deluſion, as hath bin ſuppoſed: and by ſome, whoſe laborious Pens have endevoured a conviction, moſt unjuſtly bin ſtiled diabolicall.

1. Firſt, it is abſolutely true, and an unqueſtionable law of Nature, (if, prejudice laid aſide, right reaſon takes

her place,) that all actions and motions are performed by *Atomes*, or ſmall bodies, moving after a different manner, proportionable to their ſeverall figures; and not by I know not what qualities, (which have onely a notional ſubſiſtence,) acting without the bodies to which they belong, and leaping from one ſubject to another, without changing their forms.

2. There is a conſtant *Effluvium* or expiration of ſuch Atomes from all bodies: cauſed by a compreſſion of other Circumjacent bodies; driving the parts cloſer together; or elſe by the mtion of other Atomes crowding into the porous parts of that body; diſturbing the repoſe and quiet of the former inhabitants, and thruſt them out, to wander about in the air, till they meet with ſome other body of the ſame nature, or return to the ſame body from whence they were driven, where they may obtain their deſired reſt a while, which is but very ſhort.

This

5. This expiration, ſome by the help of Glaſſes, have ſeen in the form of a miſt to flow from a Loadſtone, and other bodies whoſe aporcheas are more plentiful: In bodies that are actually hot, this Fffluvium is ſenſibly apparent to the ſmell, eſpecially to Creatures of an acuter ſenſe; whoſe expirations hanging in the air, or upon the ground; are as ſure a guide to the perſecuting Dog, as if they were continually in his eye. *Sanctorius* teacheth us too, that they are no leſſe ſenſibly diſcovered by weight, who affirm, a Man in one nights ſpace to be lighter by three pounds weight, then he was at the beginning of the night, cauſed onely by this inſenſible expiration.

3. Theſe Atomes are not of one Figure, nor of one magnitude or groſſeneſſe: ſome being ſo ſubtile and ſlender, that they admit of no oppoſition, but continue their courſe through all mediums: and whatever may ſeem

to oppoſe them in their way, ſuch are not diſcovered by us, but by their effects; they penetrating, and acting what their Figure can do, before we are ſenſible of them: ſuch are the contagious Atomes of bodies infected with the Plague, or other peſtilential diſeaſes: which are not only communicated to others, by their harbouring in the viſitants clothes; but being diſperſt in the air, are conveighed to remote places and perſons, on whom they exerciſe their tyranny, not diſcovered till they break out into open violence. Others again are groſſer, and cannot ſo eaſily paſſe by, or through others of the ſame or greater groſſeneſſe: and are therefore driven by the ſtrongeſt, and inforc'd from their intended voyage; and ſometimes beaten into the pores of other bodies. And ſuch Atomes are apprehended by our ſenſes, as heat, cold, ſmels, colour, &c. & move more ſlowly then the former. Some are ſo groſſe that they move

move ſolid and fixt bodies out of their places, as the winde: and many others that are driven to and fro by the winde, as it moveth, they change their place. Theſe Atomes we are ſenſible of, and ſhall without much difficulty, be perſwaded to confeſſe their being and activity. The magnetick effluviums, and influences of the Planets, the ſubtile expirations of all bodies, eſpecially thoſe which are not raiſed by the attenuating of much heat are to be ranked in the firſt Claſſis, and have been heretofore Chriſtned by the name of *Occult qualities*. The others have been ſtiled prime qualities, vapors, exhalations, or the like.

4. It is another general Law of Nature, that all bodies deſire reſt; and would continue in their own proper places, if they were not diſturbed by an intruder: Reſt being the Mother of union, which is the deſire of all natural bodies.

5. There are ſome places more fit

for the receiving and holding of ſome bodies, or Atomes, then others; in which they may better and longer reſt. And that in reſpect of the faſhion and form of the pores receiving them; being proportionable, and more agreeable to the figures of the Atomes. As ſome Atomes are Angular, ſome Cylindrical, branched, ſmooth, ſharp, rough. There are in bodies pores agreeable to theſe figures; ſo that ſome Atomes ſhall bee received into pores proportionate to them, others excluded; as the fire, ſharp and penetrating Salt, creep into the pores of a Stone; which the Atomes of Water, cold, and light, cannot: the infectious Atomes of that peſtilential diſeaſe amongſt beaſts, called the *Murren*, inſinuate themſelves into Cows and Swine, not into Horſes, or Men, as the infection of the Pox or Meaſils in Men, is not communicated to Beaſts, &c. This agreement betwixt the pores and the Atomes, makes that, we call *Cognation*.

No

6. No Atomes reſt any where, but in thoſe cognate or proportionate pores. They may be driven into other bodies, or may accompany other Atomes, into pores that do not exactly correſpond with their figures, but cannot reſt there; being ſtill thruſt out by thoſe that do better fill up that place, and correſpond with the capacity and proportion of thoſe pores; and hence ariſeth a natural inclination and tendency towards thoſe bodies where ſuch pores are. For being once diſlodged, and thruſt out of thoſe cognate places, they are ſtill ſhouldered out, and preſt to give way for thoſe Atomes, whoſe figures claim a right to thoſe pores they are now wandring in: being thus thruſt out, & preſt on every ſide by other diſlodged Atoms, they are inforc'd to move that way where they finde leaſt crowding, and where the violence leaſt urgeth; and that is on the ſide where theſe pores are, and perhaps from whence they were firſt diſquieted. For other Atomes not finding entrance

entrance into the pores of ſuch bodies, rebounding back, cauſe other behinde them to ruſh into their place, to give way for them rebounding; who likewiſe not being entertained, return too, thruſting others into their room: till at laſt it comes to the turn of thoſe cognate Atomes: who being violently thruſt on by thoſe behinde them, are alſo now by theſe that were before them, returning; are preſt upon theſe proportionate pores, who in reſpect of their cognate figures, finding admitance by their entrance, make way for others of the ſame proportion to follow them. So that there is a conſtant neceſſitated motion of ſuch Atomes this way, forc'd by the impulſion of other Atomes. Which motion is natural too, in reſpect of the cognation betwixt the place and the Atomes, though in reſpect to other Atomes, and the force impreſt by them, it be violent and forc'd. And this is that motion which they ſay is cauſed by *Sympathy*. Such are all magneticall motions,

motions; amongſt which likewiſe may be ranked theſe Atomes curing at a diſtance.

7. No diſtance hinders the motion of theſe Atomes towards their natural places. For no pores agreeing with their figure, but their own, that are proportioned to them, they will ſtill be thruſt out by thoſe Atomes which are fitted for thoſe pores in which they are: ſo that being enforc'd by the preſſure of others to move from one place to another they will ſtill keep on moving that way whither they are thruſt, till they come to a place proportionable to them where they may be freed from this violence. So that as the large ſphere of magnetical motions may not ſeem wonderful, ſo neither rightly can this ſympathetical motion of theſe curative Atomes be accounted magical, if they cure the part they ſeem not to touch.

8. The nearer theſe Atomes approach to their deſired home, the reſiſtance is ſtill leſſe on that ſide, and the preſſure greater

greater on the contrary, and therefore their motion is ſwifter, in a ſhorter diſtance, and alſo ſlower at a greater.

9. There may be, and oftentimes is a Conjunction of Atomes, which in their Pilgrimage, flie on the back one of another, and may and do operate together: as the Winde doth carry with it many infectious Atomes, and ſometimes rare and comfortable ſmels.

Theſe things premiſed and layed as foundations of truth, which can (if examined with an unbiaſſed judgement) appear no other; they will demonſtratively illuſtrate this way and cure of wounds without any topicall application. It remains therefore that wee explain the manner of this operation; what the Medicine is, and why it workes more effectually at a diſtance, then if applyed to the part.

Firſt, the Medicine is made of a Zaphyrian

Zaphyrian Salt, calcined by a celeſtial fire, operating in Leo and Cancer, into a Lunar complexion. The heat muſt bee ſuch, that it draws out all adventitious moiſture, leaving it intenſly dry, and in this condition it muſt be kept. If at any time it meets with any moiſture, it loſeth its energy, and muſt to the æthereal fornace again, it muſt be ſuch a proportioned heat, and not a greater; for by exceſſe of heat, all the volatile parts and fineſt Atomes, which onely work this cure, will bee evaporated: and onely the groſſer ſaline parts remain, which neither can be raiſed to accompany the Atomes of the blood: neither if they could, would they cure; but by their ſharper angles, grate the orifices of the capillary veins, and ſo procure an efflux of blood, and not a conſolidation of the wound.

The ſubſtance of this medicament being joyned wth other unctuous bodies, is applyed

applyed to the wounds themſelves, in moſt cicatrizing and drying emplaſters. Which when the ſharp angles are blunted by the unctuouſneſſe of the adjoyned medicaments, doth dry up, and unite the wounded parts moſt effectually, as in the emplaſter called Diapalma, &c. Much more effectual then muſt the finer active volatile particles be, when they are ſeparated from thoſe more earthy, clogging parts; and conveighed into the remoteſt pores of the wounded part, by the help of the bloody Atomes returning home: upon whoſe ſcore they finde a far greater and more welcome entertainment, then if they came alone, or joyned with any other Forrainers.

The manner of applying the medicine is in this faſhion. The blood, or bloody matter taken from the wound on a cloath, muſt be lightly covered over with this powder, kept very dry; and afterwards wrapt up cloſe from the air, and ſo kept in a temperate heat; neither

neither muſt it finde any mutation to either exceſſe; the wound in the mean time muſt be kept clean, and clothed up with drie clean clothes. If it hath been an old ſore or ulcer, that Nature hath found a convenient paſſage to vent the burden of her excrements that way, and there be a tumor, (as neceſſarily there will be) the firſt dreſſing doth moſt violently drein this Fountain, and you ſhall finde the wound to run moſt ſtrangly: afterwards when the matter is leſſened, and is reduced to ſuch a proportion as nature and the medicine may conveniently buckle with it, then it turns it into laudably concocted matter, which every day leſſens, and the wound cloſeth. But if the wound be freſh, the applied medicine preſently ſtoppeth the blood, and hinders an afflux of humors to the part. So that there is nothing to be done, but the uniting the ſevered parts, which this medicine doth in a wonderful ſhort time.

The way which theſe balſamical Atomes

tomes of the Medicine, applyed to the blood, take to come to the wounded part, is next to be ſhewed. All action being performed *Applicando activa paſſivis*, either by a real or virtual (which indeed muſt be reall too) contact, it muſt needs make this cure ſuſpected; becauſe the medicine being applyed only to the blood, there appears to be no kinde of contact, & therefore it ſhould follow, that there is no operation or action upon the wound; eſpecially when the wound is at ſo great a diſtance from the medicine.

But if we ſhall review the former Laws of Nature, the contact will ſoon appear to be as real, as that made by the Sun darting his beams into any of theſe inferiour bodies, though thouſands of miles remote from it. The medicine therefore being a body conſtituted of ſeveral particles, it will neceſſarily follow, that there is an effluvium, or conſtant expiration of Atomes from it, by the ſecond law of Nature. And by the ninth

ninth rule theſe may be conjoyned with the Atomes of blood extravenated, and accompany them in their flight. Nay, they muſt joyn with them, for the Medicine being a Salt, when it comes to imbibe the moiſture of the blood, is (as all Salts will be) diſſolved, and perfectly mixt together with it; which being kept in a conſtant continued heat, are continually breathing forth inſenſibly Atomes from both. Being thus united and expoſed, the particles of blood being moſt, and moſt active, they carry their companion along with them. Who by the ſixth and ſeventh rules, muſt of neceſſity be driven to the wounded part, though remote from it a very great diſtance.

When theſe companions the Atomes of the extravenated blood,

and the Medicine are come to the wounded part, the Atoms of the blood are received, finding an eaſie entrance at thoſe cognate parts, thoſe proportionate pores; with which covertly ſlips in the other of the Medicine; who meeting there with more moiſture, preſently delivers up its ſaline parts to bee conjoyned with thoſe new moiſt parts; which by the addition of theſe newly reſolved ſalt particles, become more fluid and looſe, fitter to bee driven out, which is ſuddenly done. For beſides this looſening the ſuperfluous matter in the wound, the Medicine hath ſuch parts as contracts the ſolider parts neerer together, and ſo ſhuts the orifices of the veins, that the efflux of blood and humors thence, is preſently ſtayed; and the pores being leſſened, this ſuperfluous moiſture which hindered

hindered the union of the parts, is preſt out, ſo that the wound is more eaſily ſoadred up. Which worke is quickly performed by Nature her ſelf, when there ſhall be nothing to hinder the appoſition of ſuch fitly prepared particles, as ſhee hath provided in every part for their nouriſhment and augmentation. This double work of the Medicine, the looſening and diluting the fluid parts, that diſtend the pores of the wound, (which cauſes that pain, which is an inſeparable companion of ſeparation of continuity) as likewiſe the conſtriction of the pores, and joyning the more ſolid parts neerer together; is demonſtrable in all Salts, when they are laid on bodies retaining any quantity of moiſture in them. For Salt layed on meat, cauſes firſt a great quantity of bloody water to flow

from it; after which you ſhall finde the fleſh harder, and ſhrunk cloſer together: and at laſt, if it continues long, the moiſture is clean dreined out of it. So in the making of ſome Syrups, if upon Limons or Apples ſliced thin, you ſtrew Sugar (which is a kinde of Salt) it will drein out all their moiſture, and leave them dry and hard. This being done by ordinary Salts, wee muſt expect a far greater & ſpeedier operation from this, whoſe parts claim a greater activity in binding up and cloſing, then any Salt, as every tongue will ſoon confeſſe that toucheth it, either before or after its preparation. It will be no wonder then, to ſee ſo large an efflux of Matter from an Ulcer, till all bee conſumed, after the firſt dreſſing of the cloth; or to ſee ſo ſudden a ſtop given

given to the blood flowing from the wound.

The cloth in which the blood and Medicine are kept, muſt bee wrapt up cloſe, and kept warm in a temperate heat, not declining to either exceſſe. Firſt, becauſe the cold doth prohibit the expiration and breathing forth of theſe Atomes, ſo that the wounded part is for that time deſtitute of thoſe balſamical Atomes, which ſhould drein forth the ſuperfluous humidity, and reſtrain the afflux of blood, and other humors to the part. So that the blood flowing to this weakned part, diſtends its pores, and veſſels again beyond its natural and accuſtomed limits, and rends aſunder what was almoſt united before. And this is that which cauſeth that pain, occaſioned by expoſing the clothes

to

to the cold air. Beſides, this hindring the efflux of theſe aporrheas from the cruentated cloth by cold, there may bee ſome extraneous Atomes; (as thoſe of cold or icy parts, whoſe activity in penetrating of bodies, I conceive to bee little leſſe then thoſe of fire,) which being conveighed along with theſe Atomes from the cloth, more ſlenderly now tranſmitted; may disaffect the wound, according to the figure and nature of the Atomes: as may appear by that ſtory of Sir *Kenelm Digbies* uſage of Maſter *Howels* cruentated Garter, heating it over coals in a diſh of Vinegar; which put the lame Gentleman into extream pain and torture; but upon the removall of thoſe, and the freſh dreſſing of the Garter, hee preſently received eaſe, and in a very ſhort time a perfect Cure.

The

The other extream, *viz.* of heat, doth as much exaſperate the wounded part, as may appear by this ſtory, as well as by another, from a very credible Reporter, who in the cure of ſome Scrophulous Ulcer by this powder, had almoſt perfected the Cure; the Father ſtill keeping the Cloth in his pocket; but being to lodge abroad one night, left the Cloth with this Gentleman; who dreſſing the Cloth, as before, in the morning put it up in his owne pocket, and kept himſelfe by a great fire all that day; and at night, laid it in his bed, under his ſheet only, and ſo kept it extreamly hot. The Child which had before continued in very good eaſe ſince the firſt dreſſing, all that afternoon and the night following was extreamly tortured, and ſlept not at all. In the

morning when he came to dreſſe the Childe again, hee found the wound had bled much, and was very ſore: but dreſſing the Cloth again, put it up in his own pocket; and ſo returned to his good fire; the Childe continuing in extreamity of pain, they ſent their ſervant to acquaint him with it; who preſently apprehending, that the change of the keeping of the Cloth might bee the cauſe of it, gave the Cloth to the Boy to put it in his pocket: who following his imployments, came not to the fire at all, and in a quarter of an hour after, hee found the Childe playing, and in very good eaſe. The reaſon of this was not onely becauſe there were many fiery particles joyned with theſe Atoms, which inflamed the wound; but becauſe the extreame heate working on the matter and Medicine

dicine in the Cloth, in an unuſuall manner, raiſed a far greater number of theſe ſaline parts then uſually; which when by the ſanguineous Atomes they were introduced, did by their ſharp angular parts ſhave and corrode the ſmall orifices of the veines: and gave way to that efflux of blood, and by their ſharpneſſe lay continually pricking and dividing the tender parts, which was occaſioned by ſome of groſſer and more fixt parts.

This Cure, by this Atomicall energy wrought at a diſtance, is more ſudden, then any the moſt excellent Balſame could perform, or then the ſubſtance of the Medicine it ſelf, applyed to the part could do. For firſt, as I ſaid, the Medicine being a calcined Salt; the ſharp part of it would erode

erode the orifices of the ſmall veſſels, which in all wounds are divided; and would prove rather corroſive then curative. But being thus tranſmitted with the united Atomes of blood, they ſteal in undiſcerned, and by the vertue of that cognation betwixt the Atomes of the blood and the pores they are to enter; they are more freely entertained, and admitted to paſſe and inſinuate themſelves farther, then if they came alone; whoſe diſproportioned Atomes would ſcarce finde an entrance there, without the other. Being thus freely admitted into every pore, and being but the finer volatile particles, whoſe angles though keen, yet have not that hardneſſe to fret off the tender mouthes and termination of veins: Firſt, they dilate the ſuperfluous humid parts,

and

and make them fit to bee expelled : then by their more then ordinary reſtrictive power ſhrink together the pores, and ſqueezeth out that humidity, and glew together thoſe diſunited parts. And thus in a very ſhort time is the cure performed.

The eaſing of the Toothach by this Medicine too, is performed by its Atoms, repelling thoſe humors which were flowing to, and diſtending the thin, and moſt accuratly ſenſible membrane, including the Marrow of the Teeth. Which is done by cloſing and ſhutting the pores, that the already imbibed humours muſt be expreſt, and others that are flowing, are prohibited from entering.

Thus

Thus have I cleared what to Philoſophers ſeemed one of Natures Cabbinet-Secrets, but to others, that condemn all they underſtand not for Magicall, it hath ſeemed, and been accuſed to have been done by ſome diabolicall compact. There have not been wanting ſome, that have laboured to undeceive mens underſtanding, and to clear the proceſſe of this cure: but upon principles, I confeſſe, of as much difficulty, and that require as great a portion of faith to believe them, as the thing it ſelf. Their misfortune hath occaſioned mee to look ſomething more narlowly into the true principles of Nature; which though I ſhall not beg to bee granted mee gratis, yet I ſhall appeal to every mans reaſon (by which Rule I would have

have them examined) whether they do not truly agree with the uſuall wayes of Nature, by which ſhee conſtantly workes: if upon any ones juſt tryal they ſhall appear to be erroneous, it ſhall not grieve me to become his convert, recanting my miſtakes.

FINIS.